



“EASTERN MAGNIFICENCE
& EUROPEAN INGENUITY”
Clocks of Late Imperial China

CATHERINE PAGANI

MICHIGAN

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ANN ARBOR

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*For my parents, Richard and Yvonne Pagani,
and my late grandparents, Dario and Mary Pagani*

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Abbreviations

- BL Brian Loomes. *Watchmakers and Clockmakers of the World*. Vol. 2. London: NAG Press, 1976.
- DL David S. Landes. *Revolution in Time: Clocks and the Making of the Modern World*. Cambridge: Belknap Press of Harvard University Press, 1983.
- GB G. H. Baillie. *Watchmakers and Clockmakers of the World*. 3d ed. London: NAG Press, 1969.
- GM George Macartney. *An Embassy to China: Being the Journal Kept by Lord Macartney during His Embassy to the Emperor Ch'ien-lung, 1793–1794*. Ed. J. L. Cranmer-Byng. London: Longmans, 1962.
- H-S Simon Harcourt-Smith. *A Catalogue of Various Clocks, Watches, Automata, and Other Miscellaneous Objects of European Workmanship Dating from the XVIIIth and the Early XIXth Centuries, in the Palace Museum and the Wu Ying Tien, Peiping*. Beijing: Palace Museum, 1933.
- LEC *Lettres Edifiantes et Curieuses, Ecrites des Missions Etrangères*. Vols. 16–24: *Mémoires de la Chine*. Vols. 25–26: *Mémoires des Indes et de la Chine*. Paris: Merigot, 1780.
- LP Louis (Aloys) Pfister. *Notices Biographiques et Bibliographiques sur les Jésuites de l'Ancienne Mission de Chine, 1552–1773*. 2 vols. Shanghai: Imprimerie de la Mission Catholique, 1932.
- LY Lu Yanzhen. *Qinggong zhongbiao zhencang* (Precious collection of Qing-dynasty palace clocks). Beijing: Gugong bowuyuan, 1995.
- MR Matteo Ricci. *China in the Sixteenth Century: The Journals of Matteo Ricci, 1583–1610*. Ed. Nicolas Trigault, trans. Louis J. Gallagher. New York: Random House, 1953.
- P1 Osvaldo Patrizzi. “The Watch Market in China.” Part 1. *Arts of Asia* 10, no. 2 (March–April 1980): 65–75.
- P2 Osvaldo Patrizzi. “The Watch Market in China.” Part 2. *Arts of Asia* 10, no. 3 (May–June 1980): 100–111.

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Introduction

A Clockwork Universe

In 1987, thirty timepieces from the Palace Museum, Beijing, traveled to Florida and were placed on display for the first time outside of China in the Chinese pavilion of the World Showcase at EPCOT Center, part of the Walt Disney World complex in central Florida. These elaborate clocks, manufactured for the most part in the eighteenth century in Europe and China, formed an exhibition of a little-known aspect of the collecting interests of China's Qing-dynasty emperors. Clocks made in China were at last exhibited in the West next to the European pieces that had served as their inspiration. The exhibition, "Artistry in Time," introduced the public to these intricate and colorful palace objects, which were as appealing to late-twentieth-century audiences as they had been to their imperial owners two hundred years earlier.

While it is remarkable that the Chinese government would allow such delicate and valuable mechanical pieces to travel such a distance, of greatest interest is the location selected for this first exhibition of clocks outside of China.¹ While EPCOT Center offers opportunities for learning, it is essentially in the entertainment business. "Artistry in Time" thus presents us with the odd pairing of "a major American entertainment organization" with "China's most prestigious cultural institution."² The clocks, described in the accompanying catalog as "Palace entertainment pieces" and "fashionable display items,"³ found a natural home in a place designed to entertain. While this does not diminish the importance of the exhibition overall, it does little to dispel the widely held impression that these elaborate timepieces were merely imperial playthings and "glittering gewgaws,"⁴ to use the words of an eighteenth-century English maker.

These objects, however, are more than simply sources of entertainment. Termed in Chinese *zimingzhong*, or "self-sounding bells," elaborate clocks were used by their owners as status symbols, decorative items, and personal adornments, and only occasionally as timepieces. Most importantly, they were

signifiers of cultural power: Europeans, whether missionary or ambassador, had exclusive access to the introduction of both object and technology, and they used this to advantage in gaining access to the highest reaches of Chinese society. The Qing rulers controlled the dissemination of clock making within the empire by limiting the activities of the Jesuit horologists and mechanics who worked on them to the court as a show of imperial authority.

The Chinese interest in Western-style clocks dates back more than four hundred years. In 1582, the Jesuit missionary Matteo Ricci (1552–1610) arrived at Macao from India with a European mechanical clock, which he carried with him on the recommendation of Father Michele Ruggieri (1543–1607), the representative of the bishop for the missions who had been in Macao since July 1579. In his efforts to gain Chinese support for the Order, Ruggieri had suggested in a letter to the general of the Jesuit missions in Rome in 1581 that the Jesuits bring to the Far East, in addition to chapel furnishings and tapestries depicting biblical themes, one large clock that chimed the hours, and a smaller one for domestic use, which were to be given to the emperor.⁵ One military official in Guangzhou had already been the recipient of European clocks from Ruggieri,⁶ an act that increased the demand for such things by other mandarins, including Guo Yingping (1529–86), the governor-general of the provinces of Guangdong and Guangxi, who was eagerly anticipating his gift. When Ricci arrived in August carrying an elaborate watch given to him for the China mission by the father provincial of India, it seemed that the Jesuits were in a position to give the official what he wanted, bringing closer their goal of setting up a residence outside Macao, on the mainland. According to the account of the mission’s progress, as reconstructed in 1615 by Nicolas Trigault (1577–1628) from Ricci’s diary and other writings, when the viceroy Chen Rui (ca. 1513–85) heard about this “certain beautiful piece of mechanism made of brass that struck the hours without anyone touching it,”⁷ he not only issued an invitation for the missionaries to visit him at their convenience, but also officially granted them permission to establish a house and church in Guangzhou.⁸ This was the beginning of a long practice of gift giving by the Jesuits in their hope of reaching the capital of Beijing and setting up residence there. It was not until January 24, 1601, that Ricci was able to present to the emperor at the Chinese capital a number of curiosities from Europe, including Christian religious paintings, glass prisms, hourglasses, coins, a statue of the Virgin Mary, a small harpsichord, and two striking clocks.⁹

Although Ricci is known for his contribution to the Chinese understanding of the Western sciences of cartography and astronomy, his presentation of the clock to the Chinese court and his subsequent introduction of Western horological technology were to be his most enduring contributions.¹⁰ That clock’s importance to the relative success of the mission was observed by Father Alvarez Semedo (1586–1658), who himself had lived twenty-two years at the Chinese court:

[The Emperor] did highly prize the pictures of our Saviour and of the Blessed Virgin; he much admired the Harpsicon; and presently gave order, that some of the Eunuchs should learne to play upon it. When he came to the Clock, which was a piece of much skill and workmanship, and an invention altogether unknowne to the Chinesses, because he knew it struck the hours of its owne accord, and that at present it was not in order, not so much as to be shewed, he commanded that the Fathers should presently come into the Palace, and set it a going. So they were called in haste, and admitted within the second wall for within the third and fourth, none may enter, unlesse it be the Eunuchs, and the Souldiers of the night-guard, where by the Kings order given to one of the chiefe Eunuchs, the Fathers were received and entertained with all magnificence and courtesie.¹¹

While Semedo was correct in his observations of the appeal of clocks with the Chinese emperors, he, as well as others, underestimated past native Chinese horological technology. The Chinese had used a type of mechanical clock in connection with astronomy as early as the late seventh century. This technology culminated in the now-famous water-powered astronomical clock of the eleventh century, which stood over ten meters in height and had small figures that came out and struck the hours. However, while the Chinese had made great achievements relatively early on, their skill did not progress beyond their technological achievements of the thirteenth century, and eventually the knowledge was lost. Western horology, on the other hand, was different. Originating in the fourteenth century, clock making in Europe was slower in developing the same sophistication as that in China. However, in the sixteenth century it underwent rapid technological advancement, resulting in greater reliability and the miniaturization of the mechanism. This technology also allowed for accessory functions such as music, animated figures, and twirling glass-paste stars.

With Chinese achievements in clock making long forgotten, Western clocks had no native precedent against which they had to compete, and they were received by the court with great enthusiasm. Following the introduction of Ricci's striking clock came innumerable other clocks and watches of varying elaborateness and expense, made in Europe for the China trade, and in China for both the court and the native market. These clocks, with their elaborate cases of costly materials and tiny movements that sounded the hours with bells, were objects of fascination for the Qing-dynasty emperors, who collected them by the thousands. These items enjoyed a certain high status into the late eighteenth century.

This book examines elaborate clockwork in China from its introduction by the Jesuits in the late sixteenth century to the decline in interest at the beginning of the Jiaqing period (1796–1820) in the late eighteenth century. The

focus of this study is the cultural exchange between Europe and China as exemplified by elaborate clocks. Clocks were more than objects that marked the passage of time: they were commodities through which we may follow patterns of production and consumption. They combined European technology with decorative motifs inspired by Chinese aesthetics. In analyzing the dialogue between China and the West, this study places these clocks within their social and cultural context as a source of understanding of the cultures that both produced and used them. This context includes not only the place that clocks held in Chinese society and the special interest that the emperors had in them, but also these products' reflection of Europe's own vision of, and attitude toward, China. In its interpretation of clocks as cultural phenomena, this book explores how they were used, who used them, where they were made and by whom, why they looked the way they did, what made them particularly appealing to the Qing emperors, and what these pieces can reveal about the meeting of cultures in China of the late Ming (1368–1644) and Qing (1644–1911) dynasties.

Western-style clocks are ideal candidates for studying Sino-Western interaction: they had no precedent in China, the date of their introduction to the Chinese court is documented, their consumption was limited to a literate class, and their uniqueness in technology and design allows us to trace the dissemination in China of the skill and aesthetics needed to produce them. The study of clocks also allows us to gain an understanding of the influence of imperial taste outside the court. Western-style clocks were in demand by the emperors, those who wished to present tribute gifts to the ruler, and the upper classes who wished to emulate imperial taste. This demand was directly responsible for the establishment and promotion of a native industry, and with it the knowledge of mechanical principles and much-admired European decorative motifs and materials.

I am indebted to the research of several scholars who have laid groundwork for the study of the clock in China, and without whose efforts this work would not have been possible. The first monograph to deal exclusively with the clock in China is *Rérelations de l'Horlogerie Suisse avec la Chine: La Montre "Chinoise,"* by the Swiss historian of horology Alfred Chapuis (b. 1880), published in 1919. Chapuis concentrates on the Swiss makers, especially those of the nineteenth century, and although he does not provide much information on the Chinese who were making clocks in China, the imperial workshops, or on the Jesuit contribution, he does give essential documentation from various archives and letters concerning the Swiss clock-making firms who were sending their goods to China.¹²

The central figure in the study of the clock in China is Joseph Needham (1900–1995). Needham first wrote about the mechanical clock in China in his monumental multivolume work, *Science and Civilisation in China*, in the vol-

ume devoted to the mechanical arts (vol. 4, pt. 2), published in 1954. His subsequent monograph of 1960, *Heavenly Clockwork*, a collaborative effort with Wang Ling and Derek J. de Solla Price, was the first to examine fully the Chinese tradition of clock making through texts such as astronomical treatises and dynastic histories and to discover “an unsuspected missing link between the early water-clocks and later mechanical clocks found in the West.”¹³ The study focused for the most part on Su Song’s *Xinyixiang fayao* (New design for a mechanized armillary sphere and celestial globe) of 1092, providing translations of key portions of the text. A second edition of *Heavenly Clockwork* was published in 1986 with a supplement by John Combridge, whose earlier pioneering efforts to understand early Chinese escapement resulted in two working scale models of Su Song’s clock. In making such a “practical reconstruction,” Combridge may have shed a light on much earlier mechanical clocks in China, dating to the seventh century, as Su Song’s text contains elements from older works for which textual information is scanty, but which probably used the same type of escapement.

However, most studies tend to treat clocks as technological artifacts, and few have sought to connect these objects to a broader framework. One work that stands apart is Carlo Cipolla’s *Clocks and Culture, 1300–1700* of 1977. Cipolla himself had said of his work that “this is not a contribution to the history of technology . . . this is essentially an exploration in economic and social history and attention is focused on people and their inclination, on societies and their sets of values.”¹⁴ Cipolla devotes approximately thirty pages of his book to the clock in China. Equally important in placing clockwork within a cultural framework is the study by the economic historian David S. Landes, whose *Revolution in Time: Clocks and the Making of the Modern World* of 1983 is described as “a first attempt at a general history of time measurement and its contribution . . . [to] modern civilization.”¹⁵ Although Landes’s examination of the clock in China relies heavily on the work of Needham, his approach is interdisciplinary, making use of the fields of cultural history, the history of science and technology, and economic history, and is a valuable contribution to our understanding of the clock’s significance to human history. Unfortunately, neither Cipolla nor Landes draw upon Chinese or European primary source materials to offer new interpretations of the clock in China. Their discussions are valuable in bringing attention to the history of the Chinese clock by recognizing its importance in the history of horology.

There has yet to be a single study devoted to the Western clock in China that examines both imported and native-made pieces within their full context of Sino-European cultural interaction. Recent articles by Chinese scholars Ben She, Chen Kaige, Shang Zhinan, and Xu Wenlin, for example, focus on Chinese-made clocks but do not examine them in relation to contemporary European pieces and do not make use of Western sources. The same may be said of

Lu Yanzhen's lavish publication on the elaborate clocks in the collection of the Palace Museum, Beijing, *Qinggong zhongbiao zhencang* (Precious collection of Qing-dynasty palace clocks) (1995). While Lu offers perhaps the most comprehensive look at the extravagant contrivances made in Europe and China for the Chinese court, little more than descriptions of these pieces is given, and no use is made of Western-language sources. It is my aim to examine in depth European and Chinese clocks and their interconnections in late imperial China by utilizing Western and Chinese source materials to place clockwork within its broader context and thus make conclusions about the nature and effects of intercultural contact.

This study concerns itself neither with the differences between Chinese and European concepts of time, nor with the history of the mechanical clock in China. The reason for this is simple: the Western clocks introduced to the Far East by the Jesuits were regarded by the Chinese as many things: as status symbols, as decorative items, and as personal adornments, but not as timepieces. This was not unique to China: sixteenth-century European society also considered watches and clocks to be more status symbols or jeweled adornments than objects that were capable of indicating the hour. For both cultures at a certain period, the clock's primary function, that of indicating time, was unimportant. For the Chinese, the relative rarity of Western clocks and the richness of their materials made them accessible only to the higher reaches of society; their accessory functions of music and bells, animated figures, and twirling paste stars, contributed to their appeal. The gongs of the Chinese hours signaled throughout the day were all that was required by the majority of the Chinese population.¹⁶

Because the clocks were not used as timepieces, this work will not examine in detail the invention of clockwork in either China or Europe other than to provide a context for the clocks under discussion, nor will it provide technical details of the workings. By extension, discussions of the philosophy of time, and of the cultural reckoning of time, are not central to the topic of this work. Nor will this study offer a comprehensive history of nonclockwork automata in China: this topic in itself warrants a full and separate examination. This study limits itself to the period of the late Ming and Qing dynasties and the role that elaborate clocks played in the discourse between East and West.

THE CLOCK IN CHINA PRIOR TO THE ARRIVAL OF THE JESUITS

By definition, the mechanical clock has an escapement (the mechanism that regulates the driving force of the timepiece) that allows a rotating wheel to

turn slowly, continuously, and with constant speed. It has been called “the earliest and most important of complex scientific machines. . . . No one can doubt that the invention of the mechanical clock was one of the greatest scientific achievements of all science and technology.”¹⁷ The distinguished historian of Chinese science Joseph Needham wrote in the first volume of *Science and Civilisation in China*, published in 1954, that mechanical clockwork was a “distinctively European invention of the early fourteenth century” that was not picked up by the Chinese until nearly three centuries later, when the technology was transmitted to the Far East.¹⁸ Here Needham was stating long-held beliefs that clockwork, specifically mechanical clockwork, originated in Europe and then traveled eastward owing to the efforts of the Jesuit missionaries in the early seventeenth century. In this it contrasted with gunpowder, the magnetic compass, movable type, and paper: important inventions that came to Europe from China. The presumption that clockwork originated in the West was held not only by the Europeans, who claimed to have a certain scientific superiority, but also by the Chinese. In the early sixteenth century, when the Jesuits introduced European clockwork to the Far East, the Chinese were immediately attracted to the intricate watches and clocks and seemed largely unaware of their own achievements in this area. Matteo Ricci wrote of late Ming-dynasty China,

This land possesses few instruments for measuring time and in those instruments which they have, it is measured either by water or by fire. The instruments run by water are fashioned like huge waterpots. In those which are operated by fire, time is measured by an odoriferous ash, somewhat in imitation of our reversible grates through which ashes are filtered. A few instruments are made with wheels and are operated by a kind of bucket wheel in which sand is employed instead of water, but all of them fall far short of the perfection of our instruments, are subject of many errors, and are inaccurate in the measurement of time.¹⁹

Unknown to Ricci and his contemporaries, the Chinese had invented a type of mechanical clock nearly ten centuries earlier, predating the European mechanical clock with its verge and foliot escapement by six hundred years.²⁰

After the publication of *Science and Civilisation*, Needham learned of a late-eleventh-century Chinese text, the *Xinyixiang fayao* by the astronomer Su Song (1020–1101), which detailed the mechanism for a great mechanical clock tower with a celestial globe and an armillary sphere, constructed in 1088 (figs. 1 and 2). Su Song wrote the official report on the clock tower in 1092. In the later edition of 1172 by Shi Yuanzhi, Su Song’s memorial is included as introductory material, with the rest of the text being a collection of a number of other somewhat contemporary writings.²¹

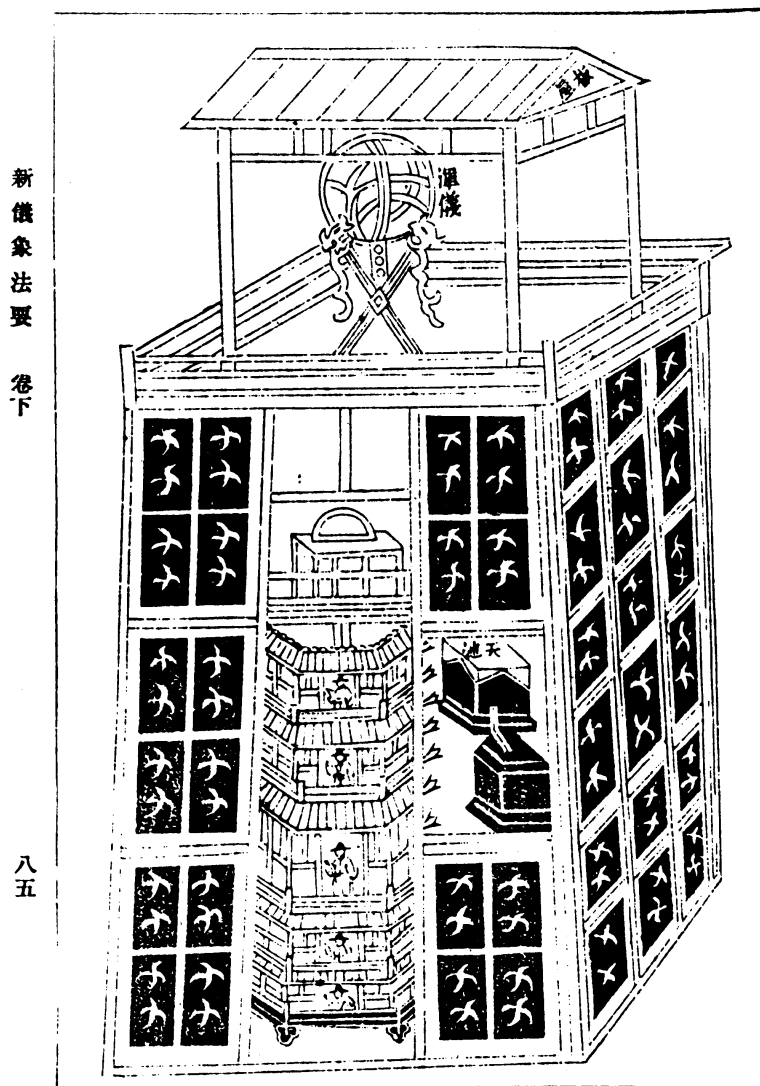


Fig. 1. Su Song's astronomical clock tower of 1088. (*Xinyixiang fayao* [1172; Shanghai: Shangwu yinshuguan, 1937], 2:85.)

Together the text and illustrations not only brought to light a long-forgotten area of Chinese mechanical arts, but also aided in understanding other earlier Chinese writings on the subject. The subsequent research on Su Song's treatise resulted in the publication in 1960 of *Heavenly Clockwork*, a seminal work in which Needham, Wang, and Price discussed the importance of Su Song's clock tower within the context of the development of Chinese clockwork, both before and after Su's achievement.²²

This began a long line of publications by various authors that made Su Song's clock the most famous of all mediaeval mechanical timekeeping devices in either China or the West.²³ The descriptions and accompanying dia-

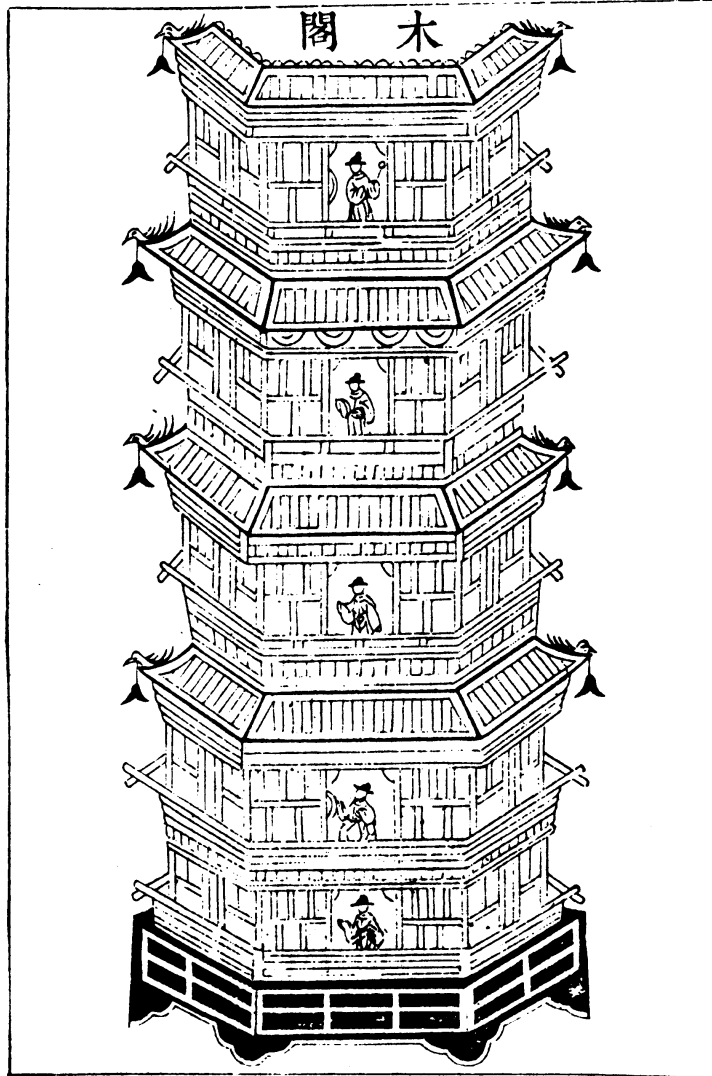


Fig. 2. Detail of the pagoda with manikins of Su Song's clock tower. (*Xinyixiang fayao* [1172; Shanghai: Shangwu yinshuguan, 1937], 2:92.)

grams in the original work have enabled working models of this clock tower to be made: these include a half-scale model of the escapement at the City of Liverpool Museum; a one-sixth scale model at the Science Museum, London; a one-sixth scale of the escapement only at the Uhrenmuseum, Wuppertal; a teak and copper half-scale model at the Time Museum, Rockford, Illinois; and a one-fifth scale model at the Museum of Chinese History, Beijing, the earliest of the group, constructed in the 1950s.²⁴

Su Song's text described a crucial component that heretofore had been missing from Chinese clockwork: an escapement, that device which is the essence, or in the words of Ernst von Bassermann-Jordan, the "soul," of the

mechanical clock.²⁵ In Su Song’s invention, the escapement was known as *tianheng*, or “celestial balance,” and regulated the movement of the wheels, which then controlled the gears and rotated the celestial globe and armillary sphere. Unlike Western clocks, Su Song’s astronomical clock tower was not powered by falling weight, but rather by scoop-wheels that used water.²⁶

Su Song’s invention was a large and impressive structure, and, to judge from the various reconstructed mechanisms, was very accurate for its day.²⁷ Set up at the Song-dynasty capital of Kaifeng, it stood more than ten meters in height. It had a five-storied pagoda located at the front, and each story had a door. At the appropriate time, manikins would appear ringing bells, banging gongs, beating drums, or holding tablets to show the hour. There were 117 manikins in total. The large water-powered scoop-wheel inside the tower set it all in motion.²⁸ The clock survived from 1092 to 1126. With the fall of Kaifeng, it was carted away to Beijing by the Jin rulers and eventually fell into disrepair. In the late twelfth century, the armillary sphere was struck by lightning, and the whole structure was badly damaged. When the Jin fled owing to the Mongol invasion, the bronze armillary sphere was left behind.²⁹

Su Song’s clock, however, was not the first Chinese clock to use what arguably can be called an escapement, but was one spectacular development in a succession of progressively more sophisticated astronomical clocks. According to Needham, the first mechanical clock was that of the Tantric Buddhist monk Yixing (683–727)³⁰ and the scholar Liang Lingzan. This “most venerable of all escapement clocks” was constructed in 725.³¹ In addition to his clock, Yixing also wrote a number of books on physics, all of which unfortunately have been lost. In the dynastic histories of the Tang (618–907), the *Jiu Tangshu* (Old standard history of the Tang) and the *Xin Tangshu* (New standard history of the Tang), Yixing’s clock is mentioned as being powered by water, causing the wheel to turn automatically. Some technical detail is given, and the description also mentions interesting horizontally mounted jacks made of wood, one of which was connected to a bell and the other to a drum. The bell was struck automatically to indicate the hours, and the drum was beaten automatically to sound the quarters.³² The passage describes a type of escapement, which had “wheels, shafts, . . . interlocking rods, stopping devices, and locks checking mutually.” The text also states that so marvelous was this timekeeper that in 730 it formed one of the essay questions for the imperial examinations. Unfortunately, after a short time, the device started to corrode and would no longer work properly.

While it has been held that Yixing’s creation was the first mechanical clock in China because it had an escapement, Needham suggests that there may have been an escapement clock made a few decades earlier. The *Chaoye qianzai* (Records from the court and from outside) of the eighth century tells of a *shi’er chenche*, “Twelve double-hour wheel.”

During the Ruyi era (22nd April–23rd October 692) of Zetian, Haizhou presented an artisan who made a “Wheel [for Reporting] the Twelve [Double-] Hours. When the wheel came to the exact south position, the Wu [south] door opened, and a jack with a horse’s head appeared. [The wheel] revolved round the four directions [as time passed] without the slightest mistake.³³

Antonino Forte, in his research on the reign of Wu Zhao (682–712), has found further evidence relating to this early mechanical clock of 692. In exploring the highly symbolic building known as the *mingtang* (luminous hall),³⁴ Forte found mention of a component known as a *dayi* (literally, a “great regulator”) as part of a structure called the *tiantang* (celestial hall), located in close proximity to the *mingtang*, and that this “great yi,” rather than being an abstract concept, was in actuality an object, very likely an armillary sphere. He found two references to a *dayi*: the first being a stele on which was mentioned that a great *yi* had been made of bronze; the second in Sima Guang’s (1019–86) *Zizhi tongjian* (Comprehensive mirror for aid in government), which states that an *yi* was cast in 686. Forte was able to identify this object as an armillary sphere with a clock. Evidence of these two clocks thus places the advent of Chinese mechanical timekeeping at least six centuries earlier than the equivalent European invention.

Needham and his collaborators first reported on Su Song’s text in 1956,³⁵ and from that time their work on Chinese mechanical clocks has stimulated discussion among historians of science and technology, historians of Chinese civilization, and those studying the history of the mechanical clock. Of primary concern is the means by which the clocks of Yixing and Su Song were powered, and whether the collection of gears, scoops, and wheels could be considered a rudimentary form of an escapement. An escapement, that device which controls the turning of the wheels and divides time into equal beats, is necessary for any timekeeper to be considered “mechanical.” As these early clocks had escapements, then mechanical clockwork can be said to have been invented in China. This leads to further speculation concerning the possibility of the transmission of the technology from China to Europe, and the suggestion that the clocks of Yixing and Su Song are forerunners of Western mechanical clocks.

Needham, Wang, and Price were the first to propose that the Chinese had invented the mechanical clock, that they had accomplished this long before the Europeans, and that the Chinese clock acted as a bridge between the earlier nonmechanical timepieces and European escapement clocks of the fourteenth century. The water-scoop and trip-lever mechanism invented by Su Song was considered the “‘missing link’ between the time-keeping properties of a steady flow of liquid [as in early clepsydras] and those of mechanically

produced oscillations [such as are found with the verge-and-foliot escapement characteristic of European clockwork]."³⁶ Therefore, "the Chinese tradition of astronomical clockwork was more nearly in the direct line of ancestry of the late mediaeval European mechanical clocks," and its importance lay in its being a "previously unrecognized type of water-driven clock."³⁷

David S. Landes, professor of history and economics at Harvard University, however, disagrees. In his 1983 publication *Revolution in Time: Clocks and the Making of the Modern World*, Landes writes that the "genius" in the mechanical clock was not in the escapement, but in the oscillation movement to divide time, as found with the later European verge and foliot. While he acknowledges the importance of Su Song's text in the history of horology, he is reluctant to term it anything other than a grandiose clepsydra.³⁸ The European verge and foliot was the first true escapement, for "[n]othing done elsewhere is comparable."³⁹ Landes calls Needham's discovery a magnificent dead end, "optative history, the story of what should have been," the result of Needham's "eagerness to restore the good name among Chinese horology."⁴⁰

[Needham] was convinced that there was more to these astronomical water-wheel clocks than the culmination of the hydraulic line of horological development. That would be a dead end, however magnificent. He preferred to see them, rather, as a beginning, as forerunners of the European mechanical clock.⁴¹

To say that Chinese clocks are not mechanical simply because they have escapements dissimilar to those in Europe implies a European bias toward scientific discoveries. The oscillator, as mentioned by Landes, is but one type of escapement, albeit a more sophisticated development, and not a separate component. Landes's main argument against the Chinese mechanical clock is more one of type than of invention. Perhaps the real issue is not whether the Chinese clock was mechanical, but, as Antonino Forte writes, that "Needham dared question the absolute originality, ingeniousness, greatness, etc. of the European mechanical clock, something which . . . Landes would not even imagine could be questioned."⁴² Needham himself was aware of this, for he wrote that with the discovery of Su Song's text "falls one of the greatest bastions of the opinion that a mechanical penchant was always characteristic of occidental, but not of oriental civilisation."⁴³

But is there any connection between the horological traditions of China and Europe? Su Song's clock cannot properly be called a "missing link" if European clockwork did not owe anything, directly or indirectly, to it. While evidence suggests the possibility of transfer of technology, it is difficult to determine in which direction the information flowed. Furthermore, the mechanical clock as invented in fourteenth-century Europe is distinctly dif-

ferent from the mechanical clock of eleventh-century China. Both divided time into equal beats but accomplished this in much different ways, showing different solutions to the same problem.

For European horology, the verge-and-foliot escapement was so fundamental a concept that it was used for nearly five hundred years until the invention of the pendulum in the late sixteenth century. First mentioned by Galileo around 1582⁴⁴ and published in 1639, developed by Dutch astronomer and physicist Christiaan Huygens (1629–93) in 1657,⁴⁵ the pendulum added precision to timekeeping, and its popularity spread rapidly. This was followed by the use of the spring drive, instead of a weight, which occurred some time in the late fifteenth century.⁴⁶ In the late seventeenth century came a number of changes in rapid succession. New escapements came about, first the anchor escapement and the deadbeat escapement of 1680.⁴⁷ The most important development in horology, though, was the use of the balance spring. The weight-driven clock was limited in its usefulness, as it could not be moved. With the invention of the balance spring by Huygens in 1675,⁴⁸ clocks could be made smaller and transportable.⁴⁹ (These “portable” timepieces were hardly that: they ranged in size from a very large, spherical watch to a table clock.⁵⁰ A metal cover protected the hands and dial, as crystal covers did not come into use until after 1610.) The last great development was that of the marine chronometer that could keep accurate time in open water, successfully developed by John Harrison in the mid-eighteenth century.⁵¹ Ultimately, it was the mechanisms of the European clocks that held far more potential.

After Su Song’s famous clock of the early eleventh century, the next major development in clockwork technology came about in the Yuan dynasty (1271–1368) when the Chinese mathematician, civil engineer, and astronomer Guo Shoujing (fl. 1280) was at the Mongol court of Kublai Khan. Guo made two clocks for the ruler, both of which had jackwork and were powered by water. He also made a mechanically rotating celestial globe that worked like that of Su Song before him. Guo’s early water-driven clocks were quite elaborate. In 1262, he made a “precious mountain clepsydra” (*baoshan lou*) for Kublai Khan. Its description, as well as that for the water-powered Illuminated Clepsydra of the Hall of Great Brilliance (*Damingdian denglou*, also thought to be by Guo though not specifically ascribed to him), may be found in the *Yuanshi* (History of the Yuan dynasty). The text begins, “The illuminated clepsydra was made seven *zhang* high [about seventy feet], and the frame was made of metal. Above its curved beam in the center there were cloud pearls, with a sun to the left and a moon to the right. Beneath the cloud pearls was suspended another pearl. The two extremes of the beam were decorated with dragon heads that could open their mouths and roll their eyes.” The text continues on to describe the different kinds of jackwork, including some in the

form of immortals or of animals, others indicating the time on tablets, all of this accompanied by the sound of bells, drums, and gongs.⁵²

Guo also constructed a mechanically rotating celestial globe, which unfortunately is no longer extant, as it was melted down at some later date. Matteo Ricci, on his trip to Nanjing in 1600, made note of it in his journal, as did the Jesuit Louis-Daniel Le Comte (1655–1728) in 1696.⁵³

These instruments had stood the test of rain and snow and change of weather for nearly two hundred and fifty years, with no detriment to their original splendor. . . . Later on, Father Matthew [Matteo Ricci] saw similar instruments at Peking, or rather duplicates of these, and undoubtedly cast by the same artisan. It seems certain that they were molded when the Tartars were in power in China, and this would indicate that they were designed by a foreigner, who had some knowledge of European astronomical science.⁵⁴

Needham and others believe that Guo's celestial globe was probably melted down after the Jesuits were made directors of the Astronomical Bureau, not under Ferdinand Verbiest (Nan Huai ren, 1623–88), who refitted the observatory in 1669 and who did not destroy any of the old instruments, but perhaps under Bernard-Kilian Stumpf (Ji Li'an, 1655–1720).⁵⁵

With the fall of the Yuan dynasty in 1368, much of what the Mongols had built, including their water-powered clocks, was destroyed. This was not an antitechnology movement by the Ming emperor, but rather, it seems, a backlash against the conspicuous consumption, at the expense of the Chinese, of the Mongol court.

The clock-making tradition was not eradicated, although there remained little evidence of its former glory. Instead, the knowledge was applied to sand clocks and incense clocks. The strangeness of incense as a material to indicate the hour was the object of curiosity for the Westerners who arrived in the late sixteenth century. There were different types of these timekeepers, which, like sand clocks, had no escapements; they simply indicated the passage of time through the combustion of either sticks, spirals, or trails of powdered incense. The sticks and spirals had intervals marked on them to show how much time had elapsed. Incense clocks, also called aromatic seals, used powdered incense compressed through metal templates forming elaborate tracteries resembling characters on a Chinese seal (fig. 3). The incense would follow the trail when burning, passing markings on a surface of wood or stone. These could burn anywhere from a day to a month or longer.⁵⁶ Clepsydras continued in use,⁵⁷ as one is illustrated in the *Huangchao liqi tu shi* (Illustrated regulations for ceremonial paraphernalia of the Qing dynasty) of 1759 (fig. 4),⁵⁸ but this kind of timekeeping was only a minor practice, and thus when the Jesuits arrived car-



Fig. 3. Incense seal in the form of a *ruyi* scepter; *Paktong*. Overall length 29.2 cm, height 4.1 cm. Collection of Silvio A. Bedini. (Silvio A. Bedini, *The Trail of Time* [Cambridge: Cambridge University Press, 1994], fig. 84.)

rying their “bells that rang by themselves,” there was little evidence remaining to disprove their impression that the Chinese had no knowledge of clockwork.

Europeans arriving in China commented on the unreliability of Chinese timekeepers. Matteo Ricci wrote, “Their clocks up to now used water and the fire of certain odoriferous fibres made all of the same size; they make also others with wheels which are moved by sand; they are all very imperfect.”⁵⁹ The Jesuits were not the only Europeans to hold this opinion. Two members of the



Fig. 4. *Hulou* (clepsydra). (*Huangchao liqi tu shi* [1766; Taipei: Shangwu yinshuguan, 1976], *juan* 3, 76a.)

Dutch embassy to China in 1665, Pieter de Goyer and Jacob de Keyser, observed:

The Chinese, ingenious and subtle, barely have instruments to show the hour, and those they have are so imperfect that one cannot trust in them: Those that use the method of water in many ways resemble our powder boxes, and those that work by fire resemble our wicks. There are some who dabble in sundials, but they have so little success that it is a pity. It is such that they are quite inferior to our Europeans in this skill who have the powder boxes and clocks so finely graduated that the smallest minute is marked and delineated.⁶⁰

Later writers such as Mathieu Planchon, the author of *L'Horloge; Son Histoire Rétrospective, Pittoresque et Artistique* (1898), said of Chinese horology, "Properly speaking, the Chinese do not have products of mechanical clockwork; they have only poor copies."⁶¹ Anton Lübke reaffirmed this in 1931: "The Chinese have never made any discoveries comparable with those of Europeans in the technique of clock making. The clocks . . . have of course nothing to do with time measurement in Old China."⁶²

It has been suggested that the Chinese did not develop superior clockwork technology simply because Chinese society did not require accurate knowledge of time. Objects such as Su Song's "clock," properly called armillary spheres, were designed to observe the movement of the heavens. While they could show the passage of time, they could not accurately measure it independent of the motion of the stars. Even the manikins with their tablets showing the hour, considered merely accessories to the main functioning of the clock tower, could display time only to the quarters of the Chinese hour. That these early clocks were adequate to announce the night watches was all that interested the Chinese. That they could do so with the pomp and circumstance of gongs, bells, and animated figures was a bonus.⁶³ As a result, it seemed that the impetus for mechanical change and development was absent from Chinese technology in this area.⁶⁴

A second theory places the invention of the clock at the end of the seventh century and the apparent lack of any horological technology by the Ming dynasty within the context of Chinese Buddhism. The clock was held in high regard, for it was used as a metaphor for the world. The clock works well when society itself works well through the teaching of the Buddha; neglect these teachings, and the clock, and by extension society, will not operate properly. Daoxuan (596–667) wrote that on the death of Śākyamuni, "the clockwork . . . no longer functioned. The automatons made of precious materials shed tears and the hands of some were broken." Only when Maitreya arrives will the clock (and therefore the world) function properly again.⁶⁵ Thus, the decline of the clock has been linked to the decline of Buddhism in favor of Confucianism. As the Buddhists had accepted the clock, the Confucianists now rejected it.⁶⁶ European clockwork "was never ideologized in this way; unfettered, it could follow innumerable paths of technological innovation."⁶⁷

Until the study of Su Song's text in the mid-twentieth century, which revealed the high level of mechanical mastery achieved by the Chinese in the eleventh century, Chinese clockwork was regarded as unsophisticated and limited in comparison to its European counterpart. Chinese science was well advanced, and their clock mechanism with its gear-work was well able to provide the power to rotate wheels and activate fancy jackwork. However, its European counterpart was quite different: it had the potential for greater accuracy with the invention of the pendulum; it allowed for miniaturization with the invention of the spring; and the external cases of the clocks were of a

form and decoration that were new in the Far East, and that caught the attention of the Chinese court.

For the Jesuits, this provided an opportunity to gain access to the highest reaches of Chinese society, thereby allowing them, they hoped, a chance to convert members of the court. When Jesuits arrived, they observed only sand and incense clocks, both devoid of escapements, which gave no hint of previous horological accomplishments. Thus when Matteo Ricci, astronomer and Jesuit missionary, arrived in China carrying globes, maps, and “self-ringing bells,” as the Chinese called the European clocks, the like of which the Chinese had never seen before, he found that he was well equipped to woo his imperial patrons and to offer them something new.⁶⁸

TERMINOLOGY

With the introduction of Western clockwork came a new vocabulary to denote it. The term *zimingzhong*, or “self-sounding bell,” is associated specifically with the kinds of European mechanical clockwork brought to China by Matteo Ricci in the Wanli period (1573–1620) of the Ming dynasty.⁶⁹ The earliest use of the term seems to be that in the *Xu wenxian tongkao* (Continuation of the comprehensive study of the history of civilization), of 1603, which states, “In the twenty-eighth year of the reign of Wanli of the Ming dynasty [1601], the great Westerner Li Madou [Matteo Ricci] presented a self-sounding bell, a mysterious and unknown art. The great bell sounds the hours, at midday, one sound.”⁷⁰ Ricci was also linked to these “self-sounding bells” in the *Pengchuang xulu* (Continuation of the records of the humble window) of Feng Shike, written in the early seventeenth century, in which it is said:

The foreign priest Li Madou [Ricci] presented four Japanese fans. He also had self-ringing bells that resembled small incense boxes and were made by priests. Each day had twelve hours, and in total sounded twelve times. They were extraordinary things.⁷¹

In 1759, the term appeared in the official document *Huangchao liqi tu shi*, where a European-style clock is illustrated under the title of *zimingzhong*.⁷² By the late eighteenth century, *zimingzhong* were firmly associated with foreigners. Zhao Lian wrote in the *Xiaoting xulu* (Continuation of the records of the whistling pavilion), “Today the cases of self-ringing bells are made by Westerners.”⁷³ Because these clocks were closely linked to the West and Western technology, they were also referred to as *xiwu*, “Western things,” and *yangwu*, “foreign things.” Unusual mechanical contrivances, which often included

clocks with automata, were referred to as *qiqi*, “strange things.” They were also considered to be “playthings,” *wanyi*.

Etymologically speaking, the Chinese “self-sounding bell” is not far from the English term *clock*, which originally meant “bell,” although it must be mentioned here that the English term does not imply any sort of automatism. The term *clock* has been traced to the eighth-century Latin term *cloc(c)a*, the antecedent for words in a number of languages, among them the Old English *clucge*, the western and northern European and the Middle English *clokke*, the French *cloche*, and the Germanic *klocka* and *glocke*, all of which mean “bell.”⁷⁴ The true origin of the word referring to clockwork is unknown, but it is probable that this term was associated with mechanical timepieces that first used bells, rather than dials and hands, to indicate the time.⁷⁵ By the seventeenth century, the term’s association with striking timepieces was set. Today, the word *clock* is used to denote any timekeeping device.

The ability to miniaturize the mechanism with the invention of the balance spring about 1675 led to the development of the watch. The watch, unlike the clock, had a dial and hands to indicate the time, and with this change came a change in the mechanism: these new features needed additional parts; furthermore, they eventually made the striking components unnecessary. The term *watch* has its origin in the divisions of the night: the Romans, for example, had four night watches.⁷⁶ Thus, terminologically, a timepiece that could be carried about and sounded the time was known as a clock; one that had hands and a dial was known as a watch.⁷⁷ In common parlance, everything that keeps time, with the exception of “personal timekeepers,” is called a clock. For this study, then, the term *clock* encompasses all manufactured timekeepers including sand clocks, sundials, clepsydras, and mechanical clocks and watches.

The word *clock*, of course, is different in origin and therefore meaning from another timekeeping term, the Latin *horologium*, a transliteration of which was adopted from the Greek *ὀρολόγιον*, meaning an instrument for telling the hour, and is the root for such time-related terms as *horology*. *Horologium* gave rise to the fourteenth-century English *orlogge* and later *horologe* and included sundials and water clocks that signaled the time silently. The earliest Western horologia were water-driven, and such clepsydras were adopted by religious orders who were most keen on paying close attention to the time as part of their daily observances.⁷⁸ It seems from records kept by these orders that by the eleventh century, horologia were equipped with bells to sound the canonical hours. Until the late thirteenth century, horologia were water-powered. When the mechanical clock was invented, the monastery clock was still referred to as the horologium or the horologe, whether it was weight- or water-driven.⁷⁹ Gradually though, “the mechanical horologe that struck a

bell . . . became known as a *docca*, after the Latin word for bell.”⁸⁰ Horologe was also used as a metaphor for an organized system, as in the now-obsolete sixteenth-century phrase “the devil in the horologe” who played pranks and was generally disruptive, suggesting a confusion caused by a “mischievous agent in an orderly system.” One example of this phrase is found in an early-sixteenth-century work that states, “Some for a tryfull pley the deuyll in the orlege.”⁸¹

Although this study does not discuss the technical workings of these mechanisms, it is important to point out that in the ordinary Chinese system of reckoning time, a system of twelve “double-hours,” *shi*, in each day was used. The day was further divided into one hundred equal *ke* (quarter-hours). From sunset to sunrise, each night was divided into unequal watches known as *geng*.⁸² Like the Western twenty-four-hour day system, each double-hour time division was of equal length. Whereas the old Western system of unequal canonical hours was used until the fourteenth century, the Chinese stopped using unequal hours at a much earlier date.⁸³

CLOCKS AND MATERIAL-CULTURE STUDIES

Traditional scholarship on clocks has treated them as little more than technological artifacts, or as attractive decorative items. As Thomas Michie noted in his introductory essay on timepieces in *Decorative Arts and Household Furnishings in America, 1650–1920* (1989), “Efforts to place clocks and time-consciousness within a broader historical and cultural perspective are rare and relatively recent, yet they represent innovative work in the field.”⁸⁴ Although Michie’s analysis focuses on the clock in America, much of what he writes is applicable to the field as a whole. He draws particular attention to Carlo Cipolla’s *Clocks and Culture, 1300–1700*, which Michie describes as “pioneering” and “the foundation for [the] secondary literature.”⁸⁵ The value of Cipolla’s work lies not in the information he offers on clockwork in China but rather in its approach: the clock is connected to its broader sociocultural framework in order to examine its importance within a given culture. In a similar vein, this study places clocks for Chinese consumption within a larger context by exploring their production, acquisition, and use. As objects that can be said to result directly from the cross-cultural fertilization of East and West, these elaborate clocks are utilized as one means of observing in context the larger effects of the foreign presence in China.

Studying clocks within their social and cultural context, and using objects (in conjunction with the written word) as sources of information and ideas in order to gain insight into the historical period in which they were produced follows the model used in material-culture studies. The material-culture approach is interdisciplinary; in this case drawing of the fields of social

history, the history of science, and art history. Objects can play an important role in the analysis of a historical period, as Ann Gorman Condon writes:

Man-made objects are more securely anchored in time and place than texts or ideas or values. They are concrete and time-bounded: they were made at a particular place, by identifiable people, with ascertainable materials. . . . The processes which accompanied the life of the artifact—fabrication, transactions, trade routes—can also be traced. All these expressions and bits of empirical data, these minutiae of everyday life are levers which help pry open a specific historical universe.⁸⁶

Material culture,⁸⁷ simply put, is “the totality of artifacts of a culture, the vast universe of objects used by humankind to cope with the physical world, to facilitate social intercourse, to delight our fancy, and to create symbols of meaning.”⁸⁸ Although such definitions are constantly evolving, the central concept that remains unchanged is the crucial part played by physical objects, or artifacts, which are the result of human activity. This activity may be conscious or unconscious, direct or indirect, producing items that are either made or modified by humans. Properly speaking, then, material culture is “the physical manifestation of culture”⁸⁹ that involves, as James Deetz writes, “that segment of man’s physical environment which is purposely shaped by him according to culturally dictated plans.”⁹⁰ The importance of using material culture, according to Susan Pearce, is that “it can make a unique contribution to our understanding of the workings of individuals and societies—because, in short, it can tell us more about ourselves.”⁹¹

When a society leaves behind no written records, material culture is a valuable resource.⁹² But what contribution can a material-culture approach make when documentary evidence exists? Characteristically, the study of the past has involved research in documents and other archival sources because of the vast wealth and variety in written remains, and a predisposition, dating back to classical times, in favor of the written word. According to Gaynor Cavanaugh:

For the most part, outside museums, the study of the past would appear largely to have concerned itself with the description and interpretation of change and rupture. The sheer volume and variety of available documentary evidence, its complexity and scope, and the specific ranges of interest and enquiry have guaranteed that generations of historians have chosen to look no further than archive sources.⁹³

Approaches to historical research using documents as the sole means of understanding a culture often do not offer a complete picture.⁹⁴ Texts may

give class-specific views, especially since much of the literature, its creation, its presentation, and its preservation, was in the hands of a literate or privileged class.

Archival sources are limited in what they can reveal about a period, for no account can cover the totality of past events. Events are communal and the writing of them subjective, biased not only by the writer but by the audience.⁹⁵ As such, written history gives information from the viewpoint of a single source. To broaden the historian's perspective of the past, it becomes necessary to go beyond traditional sources to examine artifacts, or examples of material culture, to gain a fuller understanding of a cultural period.

Artifacts are not accidental or random: they are the result of distinct choices of the form and materials.⁹⁶ They are “carriers of ideas . . . [and] help make autonomous focus out of ideas by remaining in the physical world long after their production.”⁹⁷ They are tangible reminders of what has been, bringing the past into the present. However, while artifacts may act as a bridge between the past and the present, they themselves cannot speak, and rely on interpretation to give voice to them.⁹⁸ Existing in the present but rooted in the past, objects do not have the deliberate biases associated with texts. Their very existence, however, suggests some intentional discrimination, as it is often the treasured or costly artifacts that survive.

Ideally, a material-culture analysis should work in conjunction with documentary evidence: artifacts are united with written records to give the full historical context. This study, for example, demonstrates that it is very difficult to discuss the effects of the intermingling of tastes and technology between East and West without looking at its products. It is possible to ascertain from traditional documentary sources that clocks and automata were given to Chinese rulers by Westerners. However, without a detailed consideration of the clocks and automata themselves, it is next to impossible to know why they were readily accepted as gifts, and what their eventual impact was. Indeed, it is not just the materials of these objects that are important, but their “intellectual and stylistic properties . . . which led to their making, acquisition [and] preservation.”⁹⁹

Thus, objects serve as a sort of visual shorthand and may be interpreted in a number of different ways. The material-culture method is perhaps more self-conscious about the research process and the researcher's own preconceptions. The purpose of the material-culture approach is to “integrate the three-dimensional remnants . . . with appropriate documentary, oral and statistical resources.”¹⁰⁰ Thus, in material-culture studies, artifacts are used, in conjunction with the appropriate literary texts and historical events, in the understanding of culture within a specific historical period.

Clocks, as products of a period of strong foreign presence in China, are a reflection of the period that shaped them. They are the result of an influx of

Western ideas in science, technology, and mechanics and of influences from European decorative arts in the style, design, and materials from which they were made. Furthermore, they are representative of contemporary Chinese customs and the activities of foreign and domestic manufacturing and foreign trade. Complementing this is the variety of texts in Chinese and in Western languages that in themselves provide interesting perspectives on the late Ming and Qing dynasties.

Utilizing a material-culture approach, this study places elaborate clockwork in a broad historical context, revealing cultural aspects that have previously been unexplored. This study therefore not only contributes toward an understanding of the phenomenon of intercultural contact and its influence on the decorative arts, but aims to create a fuller picture of the social and cultural history of the period. It builds on an existing body of literature, and uses both text and artifact to interpret cross-cultural influences in the late Ming and Qing dynasties.

ORGANIZATION OF THIS BOOK

In this work, clocks are used as one means of observing the incursion of foreigners into China and the resultant effects on the intermingling of tastes and technology. Chapter 1 examines the central role clocks played in the proselytizing strategies of the Jesuit missionaries, how the Jesuits used clocks to gain access to the Chinese court, and the importance of the Jesuit clockmakers at the court in introducing the technology to the Chinese. The issues surrounding the introduction and development of clock making parallel the successes and failures of the Jesuits in China. This chapter also offers a new interpretation of the mechanical clock in China. For the Jesuit missionaries, the clock held a deeper significance: it went beyond its role as the epitome of European technology and represented the higher beliefs they hoped to instill in the Chinese.

Chapter 2 discusses the central place that clocks held among the Chinese imperial world of “things.” The Kangxi and Qianlong emperors collected a vast number of clocks, and they promoted the establishment of a clock-making workshop within the palace. Drawing on the writings of the Jesuits stationed at the Chinese court and imperial documents from the eighteenth century, this chapter examines how clocks were displayed and used, how they were cared for and cataloged, how Europeans and Chinese alike made use of this popularity in their choice of gifts to the Qing rulers, and how the increased demand both inside and outside the court circle resulted in the development of the manufacture of these items in the cities of Guangzhou and Suzhou by native Chinese. This chapter also sheds light on the value of art objects during the reign of the Qianlong emperor in the eighteenth century

and how elaborate clockwork was used as an expression of imperial status and power.

Chapter 3 examines Western clockwork and the China trade by focusing on the interrelationship between producer and consumer: the history of the trade, and how makers adapted their designs to appeal to this particular clientele. This chapter concentrates on the works of two important eighteenth-century makers, James Cox of London and the firm of Jaquet-Droz and Leschot of La Chaux-de-Fonds, Switzerland, and compares their products and strategies in marketing to their relative successes in the trade. Ultimately, both European makers had a profound effect on the Chinese clock-making industry by providing some of the finest examples of the craft that were enthusiastically imitated by native makers eager to capture their share of the market.

Chapter 4 examines these clocks within their aesthetic milieu and shows how these objects, through an analysis of their design, can reveal misperceptions between cultures. When these clocks are examined in conjunction with contemporary texts, they can reveal much concerning not only the transfer of artistic influences between China and Europe, but also the impressions that the Europeans had of Chinese taste and of the Chinese as a whole. In comparing the design of elaborate clocks made in Europe for both the Chinese and home markets (which followed a movement in the decorative arts known as *chinoiserie*) with those produced by the Chinese for native consumption, this chapter shows that these clocks are representative of European misperceptions of the Far East, and how they helped to reinforce these misperceptions. They illustrate graphically the West's overall lack of understanding of China and an inability (or lack of desire) to adapt to the demands of a foreign culture, attitudes that are representative of feelings of overall European cultural superiority. More importantly, considering these pieces within their social and cultural context allows for a greater understanding of these stereotypes that were connected to the broader problems involved in intercultural contact.

Appendix A provides a summary of the imperial workshops in the Forbidden City; Appendix B illustrates in chart form the European makers at the Chinese court from 1601 to 1822; and Appendix C lists alphabetically the European makers of clocks and automata for the Chinese market.

A clock is a product of its period; for example, the development of further precision in marine chronometers was fueled by the need to know accurately the longitude at sea during a period of extensive discovery. It has been said that

Rarely in history has a machine so directly expressed, and in turn affected, the intellectual climate of its time. Just as the concrete mechanism—the clock as a universe—served to depict the cosmic motions on a small, humanly comprehensible scale, so it furnished methods and struc-

tures of thought by which man could explore, on a larger scale, the mysteries of the universe in which he existed and could interpret this universe as clockwork.¹⁰¹

In previous studies, the historical period has been used to reveal more about the clock, in particular its workings and its developments. There is a wealth of information on these aspects. This study will reverse the flow of information: rather than using the historical period to discuss the clock, the clock will be used here to discuss the history of the period. In both the West and the East, the clock had meaning far beyond its function.

“Pour la Gloire de Dieu”

Clock Making and the Jesuit Mission

Among the incentives for European contact with the Far East was evangelization. The desire to make conversions in China and Japan was particularly strong, as it involved a vast area of what was for the missions untouched land. Of the foreign missionary groups making contact with East Asia in the sixteenth century, the Society of Jesus was the largest and most influential. They first entered China in the late sixteenth century and continued to be a strong presence until the late eighteenth century. Their concerted effort to save souls had an impact on the cultural, social, and technological life of the Chinese court. In addition to introducing Western learning to the Chinese, they were also great disseminators of information about China in Europe¹ and had a tremendous effect on the European view of the Far East. After the suppression of the Order by Pope Clement XIV in 1773, other Catholic missionary groups carried on where the Jesuits had left off, but none had the impact in China of the Jesuits in their nearly two centuries at the Chinese court.

It was in their roles as scientists, technicians, and artists that these Jesuit missionaries made their most enduring contributions to Chinese culture. They introduced not only elements of such European sciences as cartography and astronomy to the court, but also aspects of Western art including copperplate engraving and oil painting. As a result of this encounter, the Chinese learned valuable skills and were exposed to new artistic influences. Elaborate clocks, with their European technology housed in decorative shells, provided for the Jesuits the perfect link between science and art, both of which were in demand, and ensured them almost two hundred years of access to the Chinese rulers.

The history of Western-style clock making in China is inextricably connected to the Jesuit presence at court. It was here that they introduced the theory and mechanics in an effort to teach the higher principles of the faith and thereby make religious conversions. As clockmakers at the court, these Jesuits experienced at first hand the successes and the struggles of the Order as a

whole. Conflicts that arose between technology and catechism, whether to serve the emperor or God, illustrate the larger battles the Jesuits fought with other missionary groups in the Celestial Empire, with the pope in Rome, and within the Order itself. In this way, clockwork may be seen as a microcosm of the Jesuit presence in seventeenth- and eighteenth-century China. But for these missionaries, clockwork carried a deeper significance. By the time of Ricci's arrival in the Far East, clocks and clockmakers had been used in Europe as a metaphor for God, and the creation and knowledge of mechanics would lead to a better understanding of the Scriptures, facts familiar to the well-educated Jesuits. To them, the Western mechanical clock was more than an object representing the latest European innovations: it was their key into a vast, closed empire that held the potential for countless religious conversions and represented the higher beliefs they hoped to instill in the Chinese.

The increase in missionary activity in sixteenth-century Europe coincided with the Catholic Reformation. Old religious orders were experiencing a renewal and new ones were emerging. One of these was the Society of Jesus, founded by Ignatius of Loyola (1491–1556) in 1534. The Order began to take shape at the Collège Sainte-Barbe in Paris,² where Loyola and Francis Xavier (1506–52), who later would become an important figure in the Far Eastern missions, were students.³ On behalf of the Jesuits, Loyola and five of his classmates traveled to Rome, where they were able eventually to convince Pope Paul III to grant them status of an officially recognized order in 1540.⁴

The Jesuit order was to become a strong factor in the success of the Catholic Church's missions. It has been said that the Order's "army-like organization, its complete devotion, the ability and learning of its members, and its appeal to the upper classes . . . [made it] a powerful agent in reforming the Church, counteracting Protestantism, and spreading the Faith to new lands,"⁵ including the Americas, Asia, and Africa. Largely owing to the efforts of the Jesuits, at this time the Catholic Church began what is today still considered its most ambitious and extensive missionary undertaking.

In 1552, Francis Xavier made the first real attempt at penetrating China. As head of the Jesuits in the Far East, he traveled first to India, arriving at Goa in 1542, and continued to Japan in 1549. From there he planned to travel to China to convert the Chinese. By 1552, he had landed on the island of Shangchuan, just off the China coast southwest of Macao. He set up a small church there but was unable to realize his plan as he died at year's end.⁶

The real success of the Jesuit missions in the Far East is due to the zeal and insight of Alessandro Valignano (1539–1606), an Italian Jesuit who was appointed by the society as the visitor-general to the Indies in 1573, and who laid the foundations for the unique Jesuit approach to proselytizing in China. Valignano's contribution cannot be overstated: his work has been described as

a “missiological breakthrough” in which the Jesuits were able to bring Christianity to China, have it enter the culture, and then allow it to develop in its own way.⁷ Detained at Macao on his way to Japan in 1578, Valignano had the opportunity to ponder the problems that the Jesuits were having in establishing themselves in China. Valignano was the first to realize that if the enterprise were to be a success, the missionaries would have to learn Chinese and devote their entire lives to these missions. He requested that the Italian Jesuit Michele Ruggieri (1543–1607) be sent from India to Macao to head the China mission. Upon arriving in 1579, on Valignano’s instructions, Ruggieri immediately began the study of Mandarin. He was soon joined by Francesco Pasio (1554–1612) and Matteo Ricci (1552–1610), both of whom arrived in 1582. With Pasio, Ruggieri was able to establish a residence near Macao on Chinese soil at Zhaoqing in late December 1582.⁸

In 1585, Pope Gregory XIII officially assigned the areas of China and Japan to the Jesuits. The other Catholic orders were quite dissatisfied with this arrangement, as the countries of China and Japan together constituted a very large geographical area. Their pressure resulted in a papal decree of 1600 that allowed other orders also to evangelize the Far East. The Jesuits, however, remained the dominant missionary presence.

There is no doubt that the Jesuits were determined missionaries. Strong-willed and tenacious, they persevered through daunting hardships and numerous persecutions in the name of the faith. China was unlike any other nation that the missionaries had encountered thus far. Whereas in Africa and the Americas the native population was divided up into numerous smaller tribes, China presented a unified front with an effective administration and well-developed philosophical, ethical, and social systems. Even more of an obstacle was the fact that China’s rulers had made a conscious decision to keep foreigners out. This required that the Jesuits adopt new methods of evangelization, unlike those used by previous groups.

In missionary practice, the church in the fifteenth century reflected a form of Europeanism that was fired by ethnocentrism and imperialism, and in which very little respect was shown to foreign cultures. The limitations of this type of proselytization were made abundantly clear in the sixteenth century in India, where the Portuguese missions were unable to secure a foothold.⁹ Loyola, in founding the Jesuit order, learned from this, realizing the deficiencies in the current approach. Unafraid of breaking with tradition, he advocated the adoption of a form of cultural accommodation in dealing with indigenous peoples, strategies that may be found in his *Spiritual Exercises* and *Constitutions*. This approach, which allowed the adaptation of certain rituals to fit existing native practices, was not fully understood by his contemporaries, and the Jesuits were thus seen as compromisers of the faith.¹⁰ Loyola also firmly believed that by reaching the upper classes first, his order would have a more

stable base with the poor, among whom they could better promote the glory of God.

In China, Jesuit missionary strategy as conceived by Valignano and put into action by Ricci consisted of four main components: accommodation or adaptation to Chinese culture; propagation of the faith from the “top down,” that is, reaching the upper classes first; the use of science to aid in the propagation of the faith; and an openness to Chinese values and customs. It was these policies that set the Jesuits apart from other contemporary missionary groups, such as the Dominicans and Franciscans, and ensured Jesuit successes in China.¹¹

These ideas set the tone for succeeding Jesuits and were used to great effect by Matteo Ricci. Arriving in Macao in 1582, Ricci discovered that, after many unsuccessful years in trying to “convert the poor,” it would be more beneficial to his cause to concentrate his efforts on influential scholars and those within the court circle: those Chinese officials and courtiers who, through their positions, could influence a larger number of people. This tradition of winning the souls of the heathen by converting their rulers was a concept not unfamiliar to the Jesuits and dates to the early centuries of Christianity. The first task for these missionaries, however, was the difficult one of penetrating the empire.

Although a local official was friendly toward the missionaries, Ricci and Ruggieri realized that they needed some sort of official endorsement in order to travel to Beijing and meet with the Chinese emperor. Hoping to secure this official standing through a papal legation, the normal procedure for the missionaries, Ruggieri set off to this end for Rome in 1585. Unfortunately, he died in Europe, leaving Ricci to make his way to Beijing without the legation. He made his first attempt in 1598, without success. In 1601 he tried again, arriving at Beijing where he was able to present his petition to the Wanli emperor (r. 1573–1620).¹²

Of the methods Ricci used in his efforts to enter the Chinese empire and set up residence at the capital, two are of particular importance. The first was cultural accommodation, as advocated by Loyola, which he employed most effectively, giving Chinese names to the religious figures in his translation of the catechism, for example, and by allowing the Chinese who came to his services to continue to honor Confucius. Ricci’s concept of accommodation focused on Confucius as the central figure in the Chinese-Christian synthesis as a means of adapting Christianity to Chinese culture, specifically to Confucian discourses on human nature¹³ as found in the first Chinese catechism, *Tianzhu shiyi* (The true meaning of the Lord of Heaven), authored by Ricci and Ruggieri in 1584. The policy continued into the seventeenth century with the publication in 1623 of *Xingxue cushu* (A brief outline of the study of human nature) by Giulio Aleni (1582–1649), and the *Confucius Sinarum Philosophus*, a

Jesuit translation of the three of the Four Books of Confucianism, of 1687. This method of making and holding converts would later become the main issue of debate between the Jesuits and other missionaries and would lead to fervent anti-Jesuit criticism.

Ricci's second method, termed *propagatio fidei per scientias* (propagating the faith through science), would become the focus of the Jesuits' proselytizing strategies in China. Trained in such areas as mathematics, astronomy, geometry, and cartography, the Jesuits utilized their knowledge to enable them to make more conversions.¹⁴ Although this method was unsuitable for large-scale proselytization, it was useful to them in wooing influential Chinese scholars. Discussions would begin with scientific principles and then turn to explain aspects of the faith. Eventually, it came to be understood that an acceptance of Western science went hand in hand with an acceptance of Christianity.

This strategy was aided and shaped by a growing Chinese interest in science. As the Ming empire entered a period of decline, scholars seeking a cause for the dynasty's problems targeted the writings of the early Ming philosopher Wang Yangming (1472–1528) as the source of the problem. The Chinese literati of the early seventeenth century rejected Wang's notion that the source of moral action came from within one's own being (*xin*, "heart" or "heart-mind") and looked for more practical, outward solutions in the form of *shixue*, "solid learning" or "concrete studies."¹⁵ This existing Chinese interest made the Jesuit strategy of using science to make converts all the more important, for it allowed them to reach the influential literati and created an environment in which these scholars were receptive to Jesuit ideas. In response, the Order sought men for the China mission who were trained specifically in areas of science and technology.

The Jesuits were ideal communicators of information on European science, as the Order itself stressed training in this area. Members both taught and studied alongside the best scientific minds of Europe; and certainly the men sent to China were well versed in current theory.¹⁶ Some of the French Jesuits, in fact, were members of the prestigious Académie Royale des Sciences in Paris and engaged in scientific research; their aim was to increase knowledge by transmitting observations made abroad to the academicians in Paris.¹⁷ In addition to theoretical knowledge, the Jesuits also brought tangible examples of European science to engage the interest of the Chinese, thus taking advantage of an already-present Chinese curiosity in objects from the West. The most important of these were the mechanical clocks and watches.

Ricci had discovered the value of European objects in securing a place for the missionaries when he used such items to facilitate his journey to Beijing and obtain his audience with the emperor in 1601. Much was made in Ricci's diary of the emperor's interest in the two chiming clocks that he said were

especially prized. Ricci's accounts were intended to elicit support for his missions and therefore may not be seen as truly accurate reporting of imperial attitudes; however, contemporary Chinese sources and extant objects show that there was indeed a genuine imperial interest in European clocks. In his diary, Ricci wrote of the emperor one day demanding these curiosities:

[W]ith no forewarning whatsoever, the King sent word for them to come to Peking without delay, and to bring along their presents. He was sending along a Magistrate from the High Court of Ceremonies to assure their safety on the road. . . .

They say that one day, the King, of his own prompting, suddenly remembered a certain petition that had been sent in to him and said, “Where is that clock, I say, where is that clock that rings of itself; the one the foreigners were bringing here to me, as they said in their petition?”¹⁸

Further emphasis on the importance of these clocks and watches to the Chinese mission was given by Jean-Baptiste Du Halde in his *Description of the Empire of China*, published in the first half of the eighteenth century.

It is well known, as I have elsewhere mentioned, that P. Ricci owed the favourable Admission he obtained into the Emperor's Court to a clock and a repeating Watch, of which he made a Present to the Prince, who was so much charmed with it that he built a magnificent Tower purposely to place the Clock in; and because the Queen-Mother had a desire for a watch of the same kind, the Emperor, who was loth to part with it, had recourse to a Strategem, by ordering the Watch to be shewn her, without winding up the striking Part, so that not finding it according to her Fancy, she might send it back again, as in effect she did. They did not fail afterwards to gratify the Emperor's Taste, by sending for great Quantities of this sort of Works. The Christian Princes, who had the Conversion of this great Empire at Heart, assisted the Missionaries very liberally, so that the Emperor's cabinet was soon filled with all sorts of clocks, most of which were of the newest Invention, and most curious workmanship.¹⁹

These writings were especially important in setting in the European mind the appropriateness of such items as gifts for the Chinese emperor and that clocks were a crucial element in establishing the missions at the court. Such information would be of aid to both the missions and the subsequent embassies as well.

The practice of presenting clocks to the Chinese emperor begun by Ricci continued with Father Nicolas Trigault (Jin Nige, 1577–1628). Trigault was chosen by Father Nicolo Longobardi (1565–1655) as procurator of the China mission, and charged with obtaining not only funds for the mission, but books

and other objects of value from Europe that could be used to interest members of the Chinese bureaucracy. He was a remarkable man who acquired a number of clocks for the Chinese court. He left Europe for Asia in 1607, arriving at Macao around 1610.²⁰ In 1613, he left China for Rome on the vessel *Nossa Senhora Jesus*, later to continue his voyage to the courts in the other major cities in Europe in order to publicize the missions. This trip, which took place between 1615 to 1617, was the most famous of the so-called missionary propaganda tours.²¹ When Trigault departed Lisbon on April 16, 1618, for his journey back to China on the vessel *Il Buono Gesu*, he carried with him not only ample funds for the missions but a library of books and a great number of gifts to be given to the emperor, the most numerous among them being elaborate clocks. One of the more complicated pieces was given to Trigault by Ferdinand of Bavaria (1577–1650), elector and archbishop of Cologne, in 1618.²² The unusual workings of this clock, which depicted the Nativity, are described in the following extract from a letter written by Trigault.

It was a clock the like of which we have never seen for its ingenuity, splendour and value, for in addition to all those qualities normally to be found in a well-made clock, each time the twelfth hour sounded in the upper part of the clock, the history of Christ's birth could be seen below, marvellously enacted by little figures in gilded copper.

First the shepherds came forward, then the Magi paying homage by bending their bodies almost as the Chinese do towards children to whom they honour. The Holy Virgin, with a gracious movement of her arms, shows that she accepts this homage. Then the ass and the ox thrust forward their heads as if to woo the Holy Child with their breath.

Meanwhile from a golden globe placed above, the Holy Father looks down on the scene. The globe itself opens out and discloses the Heavenly Father bringing His benediction. In the other part of the globe a remarkable mechanism causes two little angels to ascend and descend continuously. Throughout the scene, St. Joseph rocks the cradle and at the same time, most wonderful of all, an instrument plays a lullaby of its own accord.

No weights are used to produce this, but everything is done by interior wheels. This clock in gilded copper is magnificent in appearance. It stands up elegantly in the shape of a hexagonal tower and has many other qualities, which I shall omit, so as not to spoil them for those who will one day see this entirely novel work.²³

Unfortunately, this piece has not survived. We shall never know of its “many other qualities” to which Trigault alluded. However, a similar piece by Hans Schlottheim of Augsburg (1544 or 1547–1625 or 1626), datable before 1588,

probably served as the model for Trigault's piece and was formerly in Dresden, at the Staatlicher Mathematisch-Physikalischer Salon; but it was destroyed in 1945.²⁴

Trigault also wrote in the same letter of another large clock that he received in Florence from Cosimo de Medici (1519–1574), duke of Florence and grand duke of Tuscany, and that was to be a gift to the Chinese emperor. It was

a gilded clock in the shape of a dragon, the emblem of the rulers of China. As the hours are being struck, the animal opens his mouth, beats his wings, rolls his eyes, and does many other wonderful things. It is nearly two feet tall and by itself alone is valued in Europe at 500 gold pieces.²⁵

Trigault also received from de Medici “a clock without rival” in the form of a satyr that “let fly an arrow when the hand was upon the hour,” textiles from Marie de Medici, paintings and curiosities from the dukes of Bavaria, and enough money to establish fifteen residences.²⁶ The gifts were well received by the Chinese emperor.

Ricci attributed the Chinese imperial interest in elaborate clockwork to the fact that the Chinese seemed to prefer “that which comes from without to that which they possess themselves, once they realize the superior quality of the foreign product.” He continued, “Their pride, it would seem, arises from an ignorance of the existence of higher things and from the fact that they find themselves far superior to the barbarous nations by which they are surrounded.”²⁷ Here, the “foreign product” included maps and clocks; the “higher things” were the doctrines of Christianity. In so reporting, Ricci hoped to give legitimacy in Europe to one of his proselytizing strategies: that of using European science to secure a foothold in China. This “foreign product,” in fact, did allow the missionaries to reside in Beijing, and eventually they were granted a special residence and church in the Forbidden City.²⁸

It may be argued that by giving clocks to the Chinese emperor, Ricci and subsequent missionaries were simply following an established European gift-giving practice. By the sixteenth century in Europe, the clock had become a standard presentation gift between courts.²⁹ Clocks symbolized the well-regulated state, and their artistry and technology made them showcases of the high level of skill attained: they were the “pride of princely ostentation.”³⁰ Given this, it is not surprising that the Jesuits would choose for their gifts to the Chinese court objects that were already deemed most appropriate at home and that were representative of the latest technology and finest craftsmanship that Europe had to offer. As well, by the time Matteo Ricci arrived in China, clocks had already been given to foreign dignitaries. Honoraria from the Holy Roman emperor Maximilian II (1527–76) to the Turks in the mid-sixteenth century took the form of natural objects, such as spices and precious stones,

and the finest crafted objects that could not be found, at least of that quality, in Ottoman Turkey; in the 1560s, clocks made in Augsburg formed an important part of these honoraria.

For the Jesuits, the giving of clocks must have carried a deeper significance. To European society, the clock's steadfastness and regularity instilled order in a chaotic world and allowed comparisons to be made with universal harmony, the state, and the divine creator. A number of philosophical writings connected the clockmaker and the clock with the Creator and the world. In the late thirteenth century, the religious establishment used the clock to support the notion that the world was a perpetual machine and thus was eternal. Furthermore, an understanding of mechanics would lead to an understanding of higher principles. Bonaventure (1221–74), in *Retracing the Arts to Theology or Sacred Theology* of 1250–53, had written that "the illumination of mechanical knowledge is the path to the illumination of the Sacred Scripture."³¹ The mechanician in Bonaventure's writing is analogous to God, for "every artificer . . . aims to produce a work that is beautiful, useful, and enduring, . . . so that he may derive praise, benefit, or delight therefrom," for the same "reason that God made the soul rational, namely, that of its own accord, it might praise Him, serve Him, [and] find delight in Him."³² By the fifteenth century, God was considered to be the eternal clockmaker. Like the horologist who had envisioned his product in full from the start, God, too, had his fully conceived eternal plan that unfolded like the running of a clock.³³

There were as well more tangible associations between the clock and the Church, as many of the great public clocks were installed in cathedrals. One of the more famous examples is the monumental clock of Strasbourg Cathedral, built between 1352 and 1354. Its notable features included images of the Virgin and Child, the Three Magi, and the well-known mechanical rooster that could crow and flap its wings. A second clock was constructed there in 1574 and included with it were paintings of such scenes as the Creation, sculptures, and various automata.³⁴ Thus, with all of its European socioreligious associations, the clock as an appropriate gift for the Chinese emperor in aiding the missions could hardly have escaped Jesuit notice.

When the Jesuits arrived in China they found mechanisms in the form of water-clocks and sand-clocks that were not strictly speaking mechanical clocks in the European sense.³⁵ What they were seeing was a technology at the dead end of a long period of development, and limited in its wider applications. Although the European clocks were at that time relatively inaccurate, they would eventually far surpass the water- and sand-driven mechanisms.³⁶ Therefore of value to the missions were the men trained in horology who could instruct the Chinese in clock making, construct pieces according to the emperor's wishes, and make much-needed repairs on those pieces already in China. In fact, the Jesuits' skills as watchmakers were desired by the Chinese

emperors second only to their knowledge of astronomy and mathematics. When the Kangxi emperor, intrigued by the foreign clocks and watches, decided to set up his Office of Self-Sounding Bells in the late seventeenth century, the missionaries were ideally placed to “illuminate the Sacred Scripture” as they “illuminated mechanical knowledge” in accordance with Bonaventure’s philosophies.

THE CLOCK-MAKING WORKSHOP

From the time the first clocks were brought to China from Europe around 1582, the Chinese were at a loss as to how to repair and maintain them. Matteo Ricci was instrumental in remedying this by initiating a long line of cooperative effort between Jesuit and Chinese scholars. As a result, the Jesuits were able to exert an influence on both the theory and practice of horology in China, first through the publication in Chinese of Western horological principles, and then in the staffing of the imperial clock-making workshop.

The Jesuits actively promoted European scientific knowledge, and during this period important treatises on Western mechanical technology were published in Chinese. Ricci was assisted in the translation into Chinese of European works on geometry, trigonometry, mathematics, astronomy, hydraulics, and even Euclid’s *Elements* by the scholar Xu Guangqi (1562–1633).³⁷ Xu also coauthored with the Jesuit mechanic Sabatino de Ursis (1575–1620) *Taixi shuifa* (Hydraulic machinery of the West), published in 1612, for which Xu also wrote the preface. Following this came Guilio Aleni’s (1582–1649) *Xixue fan* (A sketch of European science and learning) in 1623. A mathematician and geographer, Aleni was a prolific writer and had an excellent knowledge of Chinese. In addition to his scientific works, he also published a world atlas, compiled with Yang Tingyun, based on Matteo Ricci’s world map along with the notes made by other Jesuits.³⁸

Shortly thereafter, in 1627, a pivotal work was published on the principles of European engineering and mechanics, *Yuanxi qiqi tushuo luzui* (Record of diagrams and explanations of wonderful machines of the far West). This work, which provided Chinese names for Western mechanical terms, was the first to describe a European style verge-and-foliot escapement and was coauthored by the Swiss missionary Johannes Schreck (1576–1630) and the Chinese scholar Wang Zheng (1571–1644). Schreck was well versed in the sciences of medicine, mathematics, and natural philosophy.³⁹ In Italy, Schreck was a member, along with Galileo (1564–1642), of the Cesi Academy and was a friend of Johannes Kepler (1571–1630). In the same year, Wang also published a shorter volume, *Zhuqi tushuo* (Diagrams and explanations of a number of machines), where one finds the earliest account in Chinese of the verge-and-

foliot escapement, here applied to a clock by Wang. This clock is notable as it also contained at the back a traditional Chinese type of timekeeper.⁴⁰

However, it was not enough to supply mechanical theory: practical skills were necessary to keep the pieces already in the imperial collection in good repair. The history of Western clock making at the Chinese court begins in the first years of the seventeenth century. Matteo Ricci made a number of *horloges de pierre* (sundials) for the mandarins. The missionaries explained to the Chinese that these clocks needed to be cared for, and that this could be learned in “two or three days.” The emperor then assigned four eunuchs from the College of Mathematics at the palace to study the art of clock maintenance and repair with Ricci and the fathers. The fathers lodged with the eunuchs at the college and “spent all day and night teaching these dull and intellectually sluggish beings.” Trigault reported that the eunuchs were so fearful of forgetting some of the valuable information that they wrote everything down regarding the clock’s mechanism with Ricci providing the Chinese names for each part.⁴¹ The eunuchs apparently learned their lessons well, for three days later, when the emperor called upon them to bring the clocks, “he was so pleased . . . that he immediately promoted the eunuchs and raised their wages.”⁴² Ultimately, however, the eunuchs were unable to cope with demands of the imperial court. They believed that they could not keep such complex mechanical objects running without the help of the Jesuit fathers, and the missionaries were often called to the palace to conduct repairs. The Wanli emperor, therefore, arranged to have the Jesuits at court look after the clocks.⁴³

The four eunuchs at the palace who received instruction under Ricci began an association between the Chinese and the Jesuit missionaries that would continue for nearly two centuries. Eventually the Jesuits were able to call upon professional clockmakers who were then made part of the China mission.⁴⁴ So strong was this connection that into the nineteenth century, Ricci was regarded by the clockmakers of Shanghai as their patron saint of sorts, being known as “Li Madou pusa,” the bodhisattva Matteo Ricci.⁴⁵

Sometime in the late seventeenth century, the Kangxi emperor established a number of *zuofang* (workshops) that manufactured luxury and more utilitarian goods for palace use, operating under the administration of the imperial household. Modeled after Louis XIV’s Académie Royale des Sciences from Jesuit reports, these workshops employed craftsmen from throughout China. Much research still needs to be done on the history of these workshops: it has been said that “[t]he actual evidence for the activities and production of imperial workshops in the Ming and Qing is fragmentary and hard to interpret.”⁴⁶ A detailed examination of the history of these workshops may be found in appendix A.

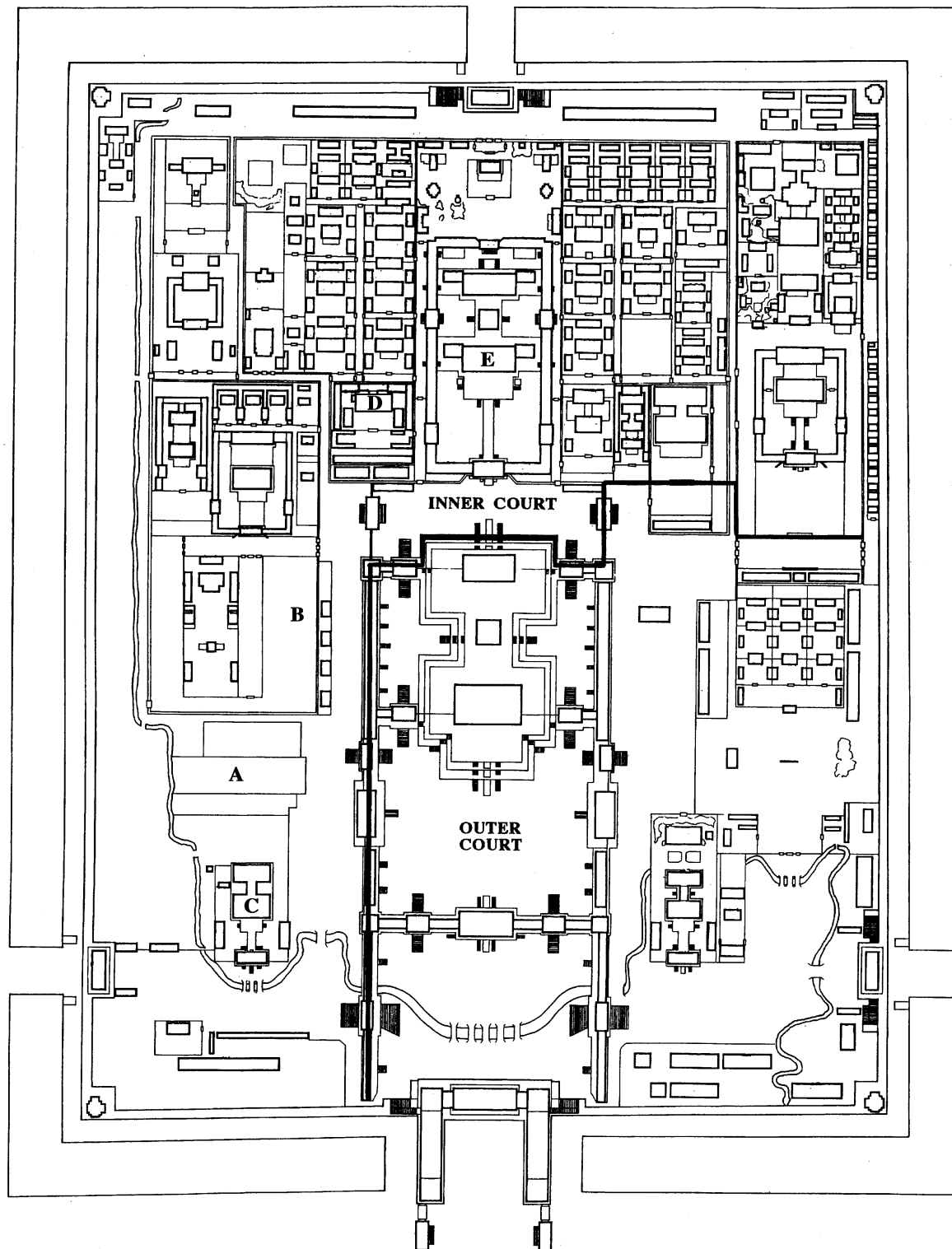
One of these workshops was devoted to Western-style clocks. The Office of Self-Sounding Bells (Zimingzhongchu) is mentioned in palace documents

of 1689 and 1692,⁴⁷ suggesting that it was established around the same time that the palace workshops were formally organized. It was located in the Qianqinggong (Palace of Heavenly Purity) complex.⁴⁸ This workshop for self-ringing bells was likely first staffed with clockmakers from Guangdong province and Jesuit missionaries; and they were aided by a group of apprentices, who developed their skills to become master craftsmen.⁴⁹ Palace archives record the name of only one maker: Zhang Qiongui of Guangdong province, but nothing more is known about him.⁵⁰ In addition to these craftsmen, court eunuchs also learned the skill of clock making. Members of the Russian Ismailoff embassy reported in 1721 that one of the emperor's favorite eunuchs presented the ambassador with a small enameled gold watch that he himself had made.⁵¹

This workshop was the predecessor of the Zuozhongchu, Office of Clock Manufacture. The Zuozhongchu was not formally named until 1723 and remained active until at least 1879 when the last dated inventory of clocks was compiled.⁵² By the time of Qianlong's rule in 1736, the workshop was well established, with the Jesuits still working closely with the Chinese. The Chinese imitated European pieces and added their own touches, producing pieces that were an odd mix of European and Chinese designs. Some pieces were marked as products of the workshop with the inscription *Qianlong yuzhi* (made by the order of the Qianlong emperor). From unpublished palace documents of the eighteenth century, there appear to have been three main locations for the manufacture of clocks for imperial consumption: two within the Forbidden City at the Yangxindian (Hall for the Nourishment of the Spirit) and at the Qianqinggong (map 1), and a third workshop at the summer palace of the Yuanmingyuan (Garden of Perfect Brightness).

Three documents dated to the twenty-first year of Qianlong (1756), the earliest extant clock inventories, provide evidence on the organization of the clock-making workshop. The three sites operated under the administration of the Office of Manufacture of the Imperial Household Department and were supervised by different managers.⁵³ While the Yangxindian and the Yuanmingyuan are mentioned in other related archival documents, the exact role of the Qianqinggong remains unknown. The former Office of Self-Ringing Bells was located within this complex; perhaps clock making continued to be practiced there. The Qianqinggong also served as a main location for the display of clockwork. Although the records are incomplete, they suggest that production in these workshops was substantial, averaging 190 clocks annually.

It was at the complex of Yangxindian that the clockmakers, painters, and engravers worked along with other craftsmen in the decorative arts, including enamels and glass.⁵⁴ It made sense to have the Office of Clock Manufacture, Zuozhongchu, in close proximity to the metalworking and enameling workshops, as the external housing of the pieces made use of other materials and



Map 1. Map of the Forbidden City showing the areas associated with clock making at the palace.

- A. Neiwufu
- B. Zaobanchu
- C. Wuyingdian
- D. Yangxindian
- E. Qianqinggong

techniques. Kangxi wrote that the Jesuits, including the clockmakers Jacques Brocard and Pierre Jartoux, worked in the Yangxindian under the general direction of Yinti, Kangxi’s eldest son.⁵⁵ The Zuozhongchu also served as a storage area for the items produced in the workshop.⁵⁶

The Yuanmingyuan also served as a location for imperial clock making. It is not possible to determine whether the clock-making energies were expended in both the Yuanmingyuan and Forbidden City concurrently or whether production moved from site to site as dictated by the emperor’s presence. A letter by the Jesuit Michel Benoît (1715–74) of 1773 suggests that some of the arts operated intermittently. For example, in writing about the Chinese painters at the court, Benoît mentions that they worked within the “Ki-Siang-Kong” (Qixianggong) for the three months that the emperor was in the palace at Beijing.⁵⁷

The strongest piece of evidence that clock making was practiced on a fairly large scale at the Yuanmingyuan may be found in a set of archival documents that refer specifically to a Yuanmingyuan zuozhongchu (Yuanmingyuan Office of Clock Manufacture) along with the workshop in the main palace complex. Compiled in the nineteenth century, beginning in the nineteenth year of Jiaqing (1812) and continuing to the fifth year of Guangxu (1879), these documents provide information dating as early as the twenty-second year of Qianlong (1757).⁵⁸ Hundreds of clocks are listed for the two sites and include clocks on display with their location as well as those set aside as gifts, grouped according to their quality. It is interesting to note that beginning with the document dated to the eleventh year of Xianfeng (1861), the Yuanmingyuan is no longer mentioned; this was the year following the ransacking and destruction of this palace complex by Anglo-French troops. It is not yet known when production began at the Yuanmingyuan; however, this site was certainly active by 1756, the date of the earliest surviving inventory of the clock-making workshop that mentions both the Yuanmingyuan and the Yangxindian under the administration of the Imperial Household Department.⁵⁹ The number of clocks associated with this workshop was approximately equal to that for the Forbidden City.

JESUIT CLOCKMAKERS AT THE CHINESE COURT

The missionaries were vital to the success of the clock-making workshop. Their writings tell of the variety of activities they performed for the emperor, along with their accomplishments, disappointments, frustrations, and conflicts. The best sources of this information are the two multivolume editions of *Lettres Edifiantes et Curieuses*, published in Paris in the eighteenth century.⁶⁰ These “edifying and curious letters” were written by members of the

foreign missions and together cover Jesuit activity in China from 1702 to 1776. These letters can be extremely helpful as well as entertaining, although the biases inherent in texts that were scripted for the most part to encourage continued patronage of the missions should be kept in mind.

In the course of staffing the imperial workshops, the missionaries created some rather extraordinary pieces that, it was said, in Europe would be considered masterpieces. Such clever constructions include an automaton in the form of a walking lion that Father Gilles Thébault (1703–66) was able to construct using the most basic of horological principles and Father Valentin Chaliér's (1697–1747) alarm clock, which the emperor kept in his own apartments. Father Sigismondo (1713–67) had planned to make an extraordinary automaton in human form that would be able to walk in a natural manner. It was feared that should Sigismondo succeed (as he was expected to do), Qianlong would then demand of the missionary: "You've made it walk, now make it talk."⁶¹

One very high-profile piece was made in celebration of the empress dowager's sixtieth birthday, which fell on January 6, 1752. The attention given to this object in the Jesuit letters is not surprising: not only were the Jesuits made a part of this important occasion, reaffirming their close connection to Qianlong, but they were presenting a marvelous example of their skill to a very important recipient. Their work, as suggested in their letters, could compete with "the most curious and most rare items from the four corners of the earth," thus confirming the triumph of European (and therefore missionary) ingenuity and enterprise in far-off China.

The hemicyclical mechanical theater stood about three feet high and had three scenes. A full description of this complex piece, extracted from a letter written by the Jesuit Jean-Joseph-Marie Amiot is given below:

As those at the court are taken as mathematicians or artists, they wished that their gift fit this title, and that it be in the taste of the Emperor. They thus made a machine, for which the approximate description follows.

A hemicyclical theater about three feet in height, its backdrop containing paintings of delicate taste. The theater had three scenes on each side, each particular design painted in perspective. In the back was a statue dressed as a Chinese holding in his hand an inscription wishing the Emperor a very long and fortunate life. This inscription was *Vouan-Nien-Hoan* [*Wan nian?*].

Also in front of each scene were statues of Chinese who held in their left hand a small gilt copper basin, and in their right, a little hammer of the same metal.

This theater, as has just been described, was supposedly to have been built on the edge of water. At the front was a lake, or more accurately, a basin from the middle of which rose a jet of water that cascaded down. A mirror represented the basin, and filaments of glass blown by a very able artisan were so slender, they imitated a jet of water so well, that one was deceived even at a short distance. Around the basin was a dial with letters on it [European and Chinese]. A goose and two ducks frolicked in the middle of the water. The two ducks paddled around, and the goose marked the present hour with its beak. The dial moved by springs that ran a clock in the machine. A magnet that was also hidden and made the dial move was followed by the goose, which was made mostly of iron.

When the hour was about to strike, the statue that carried the inscription in its hand left its compartment at the back of the theater and with deep respect showed its inscription; then the six other statues played an air by striking on his basin the note assigned to it as many times and for as long as determined by the music. With this done, the figure carrying the inscription gravely returned, not to come out again until the next hour.

This machine so pleased the Emperor that he wanted to show his appreciation to the foreigners [Europeans]; he gave them a gift that amounted to at least the expense that one would have had to pay for its construction. The honour thus given to us is here more precious than the greatest riches.⁶²

So that he could enjoy it often, the emperor later had the machine placed in the Yuanmingyuan, which he frequently visited. This was exactly what the Jesuits had hoped would happen, for Amiot wrote, “It is thus that we try, in the interest of the Religion, to win the goodwill of the Prince and to make our services to him useful and necessary so as to engage him and made him favorable toward the Christians, so that he will persecute them less and give the priests the freedom to make known Jesus Christ to those who will pay heed to them.”⁶³

The issue of whether or not to serve the Chinese emperor was addressed by Ricci, who in his proselytizing strategies had stressed focus on the highest reaches of Chinese society. His method of using science to spread the faith enabled the Jesuits to place themselves well at the court and to avoid, or at least lessen, persecution.⁶⁴ Clock making also served this function, as observed by John Bell (1691–1780), the physician with the Ismailov embassy from Russia in 1720–21:

One of the fathers was a clock-maker; and, by such means, they frequently insinuate themselves into acquaintance with people of distinction, who protect them in times of danger. For, in China, they have still a

great number of enemies, who would gladly see both them and their religion extirpated; but the favour of the present Emperor hath hitherto prevented, or disappointed, the design of such persons.⁶⁵

A number of the missionaries were even promoted within the Chinese bureaucracy or given special titles. Adam Schall von Bell (Tang Ruowang, 1592–1666), Ricci's eventual successor, was one such case. Appointed director of the Imperial Board of Astronomy in 1644 and later promoted to be subdirector of the Court of Sacrificial Worship,⁶⁶ he saw this posting as merely a stepping stone to a greater goal: the conversion of the Chinese to Christianity. This position would be held by the missionaries until the late eighteenth century.⁶⁷ Ferdinand Verbiest (1623–88) succeeded Schall and was well regarded by both the Shunzhi and Kangxi emperors.⁶⁸ From the Chinese point of view, these men were useful to them in one manner or another, for the Chinese required their technical expertise, and thus the Chinese and Europeans each had both covert and overt reasons for their activities.

In theory Ricci's plan to use science to aid the missions could hold nothing but success; in reality, it was fraught with frustration, disappointment, and conflict. Serving the emperor, especially for those skilled in mechanics, involved an enormous amount of time. Many of their letters tell of the long hours that they were required to endure repairing and constructing mechanical objects that left them little time to use their knowledge to explain the higher principles of the faith. A frustrated Father Jean Walter (1708–59) wrote, "The tastes of this prince vary, like the seasons, so to speak. It was for music and jets of water, today it is for machines and buildings. . . . The same tastes may come back, and everyday we must be on our guard so that we are not taken by surprise."⁶⁹ In 1704, Father Jean de Fontaney (1643–1710) wrote to the "Confesseur du Roy," Father de la Chaize, about the amount of work that Father Jartoux, a mechanic and horologer, and Father Brocard, a painter, were required to do for the Kangxi emperor. Such were their tasks that "they are not allowed the time to proclaim Jesus Christ, and make Him known to the officials of the Palace."⁷⁰ The situation did not improve under the Qianlong emperor. According to a letter dated September 15, 1769, written by Father de Ventavon to Father du Brasard, de Ventavon was obliged to be of service at the palace every day so that he did not have the time to breathe.

The Princes and the Nobles of the Empire appealed to the Europeans to take care of their watches and clocks that are here in great numbers, and we were but two who were in a position to accommodate them, a Father of the Propaganda and myself. Now and again we find ourselves, I would not say occupied with the work, but overwhelmed by it.⁷¹

There are many other accounts in the letters of the Jesuits that tell of enduring hardships for the sake of the success of the mission. One such letter was written by Father Jean-Denis Attiret (1702–68) in 1743 to M. d’Assaut:

To be chained to one sun or another; to labor on Sundays and feast days in order to pray to God; to paint almost nothing that is not in his taste or character; to have a thousand other encumbrances that would be too long to explain to you: all of this would send me quickly on the way to Europe if I did not believe that my brush is used for the good of the Religion, and to make the Emperor favorable toward the Missionaries who preach it, and that I did not see paradise at the end of my pains and my labors. This is the only attraction that makes me serve the Emperor.⁷²

Compounding these frustrations were the conflicts that arose between the Jesuits, the church, and among the missionaries themselves.

From the late sixteenth to the late seventeenth centuries the missions grew and developed; however, while the situation appeared outwardly to be healthy, a problem was arising that would strongly affect the progress of the missions. This conflict came not from the Chinese and their readiness to accept Christian practices, but rather from developments in Europe. At the center of this debate was the Valignano-Ricci practice of accommodation: adapting certain aspects of the faith to Chinese culture so that Christianity would appear less foreign and those Chinese who converted would still be able to show respect to the important native rituals. In his efforts to find a position for the missionaries between the church and the Chinese, Matteo Ricci decided to allow, for example, the practice of some ceremonies in honor of Confucius and ancestors: these, he felt, had no religious significance, and the missionaries could participate in them to whatever extent they wished. He hoped that eventually the Chinese Christians would adopt Catholic practices and abandon such native ones.

This was a contentious issue, and even among the Jesuits support of Ricci was not unanimous. As other orders, such as the Dominicans and Franciscans, became involved, the practice became even more hotly debated, and many felt that the Jesuits had compromised themselves and the faith all too readily. In the second half of the seventeenth century, this conflict led to a series of papal decrees that forbade many of the Chinese practices as inappropriate, and intense debate arose between the Jesuits and other orders that continued into the eighteenth century. A central document in this debate was the *Instructions* of 1659. Designed to aid newly appointed vicars apostolic in their work, the *Instructions* contained a clear attack on many of the Jesuit practices. Following this document came others of a similar vein, including one that condemned

the focus on the arts and sciences, which could lead to “corruption of the missionaries.” While not mentioning the Jesuits specifically, this work without a doubt referred to their work in China.⁷³

By the early eighteenth century, these conflicts over the use of Chinese rites prompted the pope to send to China Charles Maillard de Tournon as the special legate. He arrived in Beijing in December 1705. De Tournon, while not outwardly anti-Jesuit, was not sympathetic to the Jesuit position. After a disastrous meeting over the Chinese rites with the Kangxi emperor, the emperor ordered the legate to return to Europe. He further ordered that any missionary who wished to remain on Chinese soil would have to follow the practices as set out by Ricci. De Tournon, who at this time was in Nanjing, issued a decree in which he condemned certain practices, such as ceremonies honoring the deceased at times other than funerals and sacrifices to Confucius, and threatened with excommunication those missionaries who disobeyed. Thus, the missionaries were forced to choose between serving the emperor and obeying the papal legate. Most of the Jesuits and Augustinians decided to accept the emperor’s terms with the hope that they could then make appeals to Rome. The Kangxi emperor ordered that de Tournon be detained in Macao until word was received from Europe, and he died there in 1710.

Following the unsuccessful legation under de Tournon came a second under Carlo Ambrogio Mezzabarba, who was sent to pacify the Chinese emperor and to ensure that the missionaries were obeying previous orders. Mezzabarba reached Beijing in late 1720, carrying with him the papal bull *Ex illa die* of Clement XI, which upheld previous decisions on the rites. Obedience was expected of all missionaries in China.

Mezzabarba had several strained audiences with the Kangxi emperor. When the emperor was at last able to see the bull, he became so incensed at its position on the Chinese rites that he forbade the teaching of Christianity altogether. For the Jesuits, this suggested the end of the missions to which they had dedicated their lives, and they thus sought Mezzabarba’s assistance. The legate presented Kangxi with a list of eight concessions or permissions to the papal bull, including allowing ancestor tablets in the home and honoring Confucius in civil ceremonies. These concessions were welcomed by the Jesuits. However, Mezzabarba had failed to obtain full obedience to papal orders, an issue when the China mission was reexamined first under Pope Innocent XIII and then under Clement XVI and Benedict XIV. Benedict, in his bull *Ex quo singulari* of 1742, annulled Mezzabarba’s permissions and ordered all those who disobeyed the original document to leave China. In addition, all who served in China from this time on would be required to take an oath abiding by the papal decree.

With this bull, Rome’s position was made clear. However, issues still needed to be resolved: which particular Chinese practices were superstitious?

Was one of them the writing on silk of the names and titles of ancestors? Many such rituals were to be stopped, and in 1769 Chinese Christians were forbidden to restore temples or make sacrifices to any idol no matter what the circumstance.

These controversies over Chinese rites were felt strongly by the clockmakers, for their knowledge of mechanics often required that they engage in activities beyond constructing clocks. They were criticized for compromising the faith and engaging in counter-Christian practices. A clear illustration is disagreement that arose between a certain Father Angelo, a Franciscan who likely came to China with the Mezzabarba legation in 1720, and Father Matteo Ripa (1682–1745), a secular priest who served as a painter and engraver to the court from 1710 to 1723. Angelo was presented to the court in 1721 and became one of the emperor’s clockmakers. Father Angelo was apparently quite skilled but was prevented from displaying his talents fully, as Ripa believed that Angelo would be contributing to idolatry among the Chinese. A passage from Ripa’s *Memoirs* illustrates the conflicts within the missionary ranks:

[In 1723] His Majesty had taken it into his head to have a fountain constructed which should never cease to play. We were accordingly asked by command, whether any of us were able to contrive it. A Frenchman answered to the effect that two of his countrymen had lately arrived [as yet unidentified] who would undertake such a work. Father Angelo, through me as an interpreter, replied without hesitation, that he felt equal to the task. . . . Father Angelo had already begun a design to be submitted to the Emperor, when I was informed that the fountain required by the superstitious monarch owed its origin to the following circumstance. His Majesty demanded of a certain Bonze, who was believed to be possessed of miraculous powers, how his dynasty should be rendered perpetual—and the Bonze had replied that this might be attained whenever a fountain should be constructed whose waters should never cease to flow upon the figure of a dragon. Those who gave me this information, deeming it wrong to encourage such heathen superstition, had unanimously declared that they were unable to execute the work. . . . I deemed it my duty to prevent Father Angelo from undertaking the work, especially as by means of polite excuses and suitable representations he could avoid it without giving offence. Accordingly I communicated by opinion to Father Angelo, and found much difficulty in inducing him to adopt it.⁷⁴

Not long afterward, the emperor asked Angelo if he would assist in constructing bronze bells for a temple. Ripa objected, for the bells were probably for use in “temples of idols,” and therefore Ripa believed it his duty to spare Angelo committing “the sin of idolatry.” Father Angelo did not share Ripa’s views,

for, “as [Angelo] was well informed in mechanics, so he was deficient in theology and philosophy.” Ultimately, the two men were unable to work around their opposing viewpoints. Father Angelo “became greatly incensed, saying that I had deprived him of the honour of being employed in the service of his Majesty, and immediately went away to our residence at Haetien [Haidian], declaring that he would no longer live in the same house with me, and that for the future he would have some other interpreter.”⁷⁵

Through the detailed Jesuit accounts we may trace a succession of missionaries spanning two centuries who were required to spend their time in the workshop, all for the “greater glory of God.”⁷⁶ Most of these clockmakers and mechanics were affiliated with the Society of Jesus. In addition to the European clockmakers, the workshops were also staffed by a large number of Chinese working at the palace. Father Valentin Chalier wrote in 1736 that he had one hundred workmen under his instruction.⁷⁷ Later, in 1769, Father de Ventavon also mentions having a number of workmen at his disposal.⁷⁸ This is in keeping with the records in the palace archives, which state that a number of Chinese apprentices worked for both the Jesuits and Chinese master craftsmen during the Kangxi period and were later able to do the work of masters in the Yongzheng and Qianlong periods.⁷⁹

In the first one hundred years of the missionary presence in China, only four Westerners trained in horology were at the court: Matteo Ricci, who was at the court from 1601 to his death in 1610; Sabatino de Ursis, 1606 to 1617; Gabriel de Magalhães (1609–77), 1640 to 1677; and Tomás Pereira (1645–1702), 1673 to 1708. It was not until 1701 that a significant number of Europeans trained as horologists or mechanics were at the court: in that first decade of the century alone, five Jesuit clockmakers worked in Beijing: Pereira, Jacques Brocard (1661–1718), Pierre Jartoux (1668–1720), Gaspar-François Guéty (d. 1725), and François-Louis Stadlin (1658–1740).⁸⁰ Three more clockmakers arrived in China during the Yongzheng period: Karl Slavicek (1678–1735), Father Angelo (dates uncertain), and Valentin Chalier (1697–1747).

The horological workshop expanded further under the reign of the Qianlong emperor, during which time a total of eleven Westerners made clocks. Joining those missionaries already at the court were Gilles Thébaud (1703–66), Sigismondo di San Nicolà (1713–67), Nicolas-Marie Roy (1726–69), Pierre-Martial Cibot (1727–80), Jean-Mathieu de Ventavon (1733–87), Hubert de Méricourt (1729–74), Arcangelo-Maria di Sant’Anna (1729–84), Charles (or Joseph) Paris (1738–1804), Emmanuel Conforti (b. ca. 1754), and Pietro Adeodato da Santo Agostino (ca. 1756–1822). The workshop would never again see such a high concentration of Westerners, who had up to this time been a constant presence at the court. There were several reasons for this: by the end of the eighteenth cen-

tury, the Chinese craftsmen at the palace and in the urban centers of Guangzhou and Suzhou were becoming more proficient in the manufacturing of clockwork and did not rely so heavily on Western labor. Furthermore, the new Jiaqing emperor (r. 1796–1820) did not have a favorable attitude toward the missionaries, and at the same time, the church suffered a loss of funding with the turmoil in Europe caused by the French Revolution and the Napoleonic Wars, both of which reduced the numbers of missionaries in China.⁸¹

The most devastating blow to the missions was the suppression of the Jesuit order by the Catholic Church in Rome in August 1773 under the terms of the papal brief *Dominus ac Redemptor*, of Pope Clement XIV.⁸² The reasons for the abolition of the Society, arising out of the political maneuverings of the European Catholic monarchies, had little to do with the events in China, such as the rites controversy. Throughout Europe, the Jesuits were either being expelled from country after country or were witnessing the dissolution of the Society. Because Portugal had expelled the Jesuits in 1759, it was only a matter of time before the Jesuits at the Portuguese territory of Macao would be affected. Three years later, in 1762, the missionaries of the Society of Jesus were ordered out of Macao, and their property was confiscated. The French dissolved the Jesuits in 1764.⁸³ In China, the mission continued to function until news of the pope’s 1773 brief reached Beijing in 1775.⁸⁴

Ex-Jesuits continued on in Beijing in the position of diocesan priests under the order of the local bishop, as the Qianlong emperor allowed the missionaries to stay in the capital. The number of missionaries at Beijing decreased rapidly, prompting the emperor to put out two edicts, one in 1778, the second in 1781, requesting Westerners to serve at the court. The Jesuits who remained included Jean-Joseph de Grammont, Bernard d’Almeida, Giuseppe Panzi (ca. 1733–after 1812), Louis Cipolla (d. after 1805) and Louis de Poirot (1735–1814), who was the last ex-Jesuit in China. The missionaries were released by imperial edict in November 1785 and were allowed to remain attached to the churches or to return to Europe.⁸⁵

However, other missionaries were needed to fill the void caused by the dissolution of the Society of Jesus. Ideally, these men would be enthusiastic and learned and have an understanding of scientific principles, which the Jesuits had used to their advantage since their arrival in the late sixteenth century. A number of religious orders declined the offer to take over the China missions, but the Congregation of the Priests of the Mission, also known as the Lazarists, were eager to participate.⁸⁶ In December 1783, the Lazarists were formally notified by the Propaganda that they would assume the China missions.⁸⁷

Unlike the Jesuits, the Lazarists did not belong to an order but were secular priests with origins in the work of St. Vincent de Paul in the seventeenth century. The Lazarists did not become a major presence in China, although

they were given charge of the main church in Beijing, the Beitang (North Church), and a few of them attained positions of prominence in the court. Nicolas-Joseph Raux (1754–1801) took over as the director of the Imperial Board of Astronomy, a post formerly held by such Jesuits as Adam Schall von Bell and Ferdinand Verbiest.⁸⁸ In fact, over the next few decades, the Lazarists sent very few men to China: twenty-eight between the years 1784 and 1820, and only four from 1820 to 1830. Of this number, only eighteen entered China proper; the rest stayed at Macao.⁸⁹ Of the few priests sent by the Propaganda who actually worked in the capital, only three were skilled in mechanics: Charles Paris (1738–1804), Emanuel Conforti (b. ca. 1754), and Pietro Adeodato da Santo Agostino (ca. 1756–1822).

The following is a chronological list with short biographies of the missionaries who worked as clockmakers in China from Ricci’s arrival at the court in 1601 to the suppression of the Order in 1773. Included here are both clockmakers and those who made marvelous machines, as often these duties went hand in hand. Included in this list are several missionaries who, while not belonging to the Order of the Society of Jesus, figured prominently in the palace clock-making shops, working alongside the Jesuits.

Father Matteo Ricci (1552–1610), Italian, Jesuit

Chinese name: Li Madou

Ricci was born in Macerata, Italy, and was probably the most important figure in the Jesuit missions. He studied law in Rome before entering the novitiate. He was ordained in 1580 and left for Macao in 1582.⁹⁰ On Ricci’s death, the emperor granted a burial place for him. A site just outside of the western city gate was selected where the Jesuits were able to build a chapel and a residence, in addition to having the land for the cemetery.⁹¹

Ricci’s contributions to Chinese science were far-reaching. He produced the first world map in China in 1600 (which, unfortunately, is no longer extant) and introduced the Chinese to Western astronomy and mathematics. Understanding the importance of the written word to the Chinese scholars, Ricci undertook to learn the language and subsequently translated a number of Western scientific works into Chinese, including portions of Euclid’s *Elements*. He also presented the Chinese court with the first Western clock and taught horology at the court.⁹²

Father Sabatino de Ursis (1575–1620), Italian, Jesuit

Chinese name: Xiong Sanba

Born into an illustrious Neapolitan family, Father de Ursis arrived in Beijing in 1606 and stayed there until 1617. He was known for reforming the Chinese calendar, as well as for his abilities in the mechanical arts. He constructed a hydraulic machine that won the interest and admiration of the Wanli emperor

and his court and enabled de Ursis to obtain permission for the missionaries to preach Christianity. The ingenious nature of some of his creations caused “the curious who came to see these marvelous machines not to forget to pass in front of the church of the Savior and to venerate his image.”⁹³

De Ursis was the author of the *Taixi shuifa*, a six-volume work published in Beijing in 1612.⁹⁴

Father Gabriel de Magalhães (1609–77),⁹⁵ Portuguese, Jesuit

Alternate spellings: Magailhães, Magaillans

Chinese name: An Wensi

From the same family as the famous navigator, Magellan, Father Gabriel de Magalhães entered the Order at the age of sixteen. After studying in Goa in 1634, he was to leave for Japan, but was detained, only to be sent to China instead. He arrived in Hangzhou in 1640. He was then sent to Sichuan to care for the ill father Lodovico Buglio (1606–82), and there he learned Chinese.⁹⁶ Later, he and Buglio set off for Beijing; after an arduous journey, they arrived there in 1648, and never left.⁹⁷

Magalhães made ingenious inventions for the young Kangxi emperor, one of which was an automatic human figure that walked about for one quarter of an hour while holding a drawn sword in its right hand and a shield under its left arm. Another of his creations for the emperor was a clock whose mechanism was such that, after the bell for each hour, a different tune was played following a discharge of musketry.⁹⁸ This wonder attracted the attention of people in Beijing, and the Kangxi emperor himself visited the Jesuit residence to see it.⁹⁹ This chiming clock made by Magalhães in 1670 is mentioned in Ferdinand Verbiest’s *Astronomia Europaea* of 1687.¹⁰⁰ Upon Magalhães’s death in 1677, the Kangxi emperor wrote an epitaph in honor of Magalhães’s long service at the capital.

Father Tomás Pereira (1645–1702), Portuguese, Jesuit

Chinese name: Xu Risheng

At the age of twenty-one, Pereira left his native Portugal for Asia, studying at either Goa or Macao. He was well known for his talent in music,¹⁰¹ and it was for this reason that he first attracted the attention of the Kangxi emperor, who wanted Pereira at court. He likely arrived in Beijing in 1674.¹⁰² In addition to building an organ for the Nantang (Southern Church) in Beijing in 1700, he also installed a large clock with a carillon.¹⁰³

P. Pereira, who had a singular Talent for Musick, placed a large and magnificent Clock on the top of the Jesuits Church; he had made a great Number of small Bells in a musical Proportion, and placed them in a Tower appointed for that purpose; every Hammer was fasten’d to an

Iron Wire, which raised it, and immediately let it fall upon the Bell: Within the Tower was a large Barrel, upon which Chinese Airs were mark'd with small Spikes; immediately before the Hour the Barrel was disengaged from the Teeth of a Wheel, by which it was suspended and stopt; it then was instantly set in Motion by a great Weight, the String on which was wound about the Barrel, the Spikes raised the Wires of the Hammers, according to the Order of the Tune, so that by this means the finest Airs of the Country were heard.

This was a Diversion entirely new both for the Court and the City, and Crowds of all sorts came constantly to hear it; the Church, tho' large, was not sufficient for the Throng that incessantly went backward and forward.¹⁰⁴

Brother Coadjutor Jacques Brocard (1661–1718), French, Jesuit
Chinese name: Lu Baijia

Father Brocard arrived in 1701 aboard the vessel *L'Amphitrite* and made scientific instruments as well as clocks for the Chinese court. He was also known for other works that, it is said, “gave pleasure to the emperor.”¹⁰⁵

Gaspar-François Guéty (d. 1725), French, Missions Étrangères de Paris

Alternate spelling: Guetti

Guéty worked for many years under the Kangxi emperor at Beijing and Jehol, and he is said to have assisted Stadlin in making automata.¹⁰⁶ He arrived in Beijing in 1706.

Brother Coadjutor François-Louis Stadlin (1658–1740),
Swiss, Jesuit

Alternate spelling: Frantz Stadtlin

Chinese name: Lin Jige

When Father Gaspard Kastner (1665–1709) returned to Europe from China in 1702 telling of the need for intelligent men well versed in the mechanical arts, Brother Stadlin, a professional clockmaker from Zug, volunteered for the China missions. Stadlin had practiced his skill in a number of European cities including Vienna, Prague, Dresden, and Berlin before joining the Jesuits in Bohemia in 1687. He arrived in Beijing in 1707 and became one of the main organizers of the workshop.¹⁰⁷ With his missionary work uppermost in his mind, while Stadlin went about his work as a mechanician, he sang canticles in German.¹⁰⁸ Given Stadlin's considerable talent, there is no doubt that the missions chose him specifically for his talents in the area of the mechanical arts, to fill a need in China.

Stadlin created a multitude of objects and numerous curious machines with which he won the praise of the Kangxi emperor and his court. In fact, the emperor often visited Stadlin at the workshop. He was assisted by Gaspar-François Guéty (d. 1725) of the Missions Etrangères de Paris.

Stadlin, “an old German and a watchmaker,” was mentioned in John Bell’s journal of his travels in China in 1721.¹⁰⁹ He died in Beijing after becoming paralyzed in 1740 at age eighty-two, mourned by the Qianlong emperor.

Father Pierre Jartoux (1668–1720), French, Jesuit

Chinese name: Du Demei

Very little information is available on Father Pierre Jartoux, who was trained as a cartographer and made a number of maps for the emperor. He arrived in Beijing in 1701. In a letter of 1704 to Père de la Chaize, Father de Fontaney wrote that Jartoux “was very able in the science of Analysis, Algebra, Mechanics and the Theory of Clocks.”¹¹⁰ In his watchmaking, he was assisted by Karl Slavicek.

Father Karl Slavicek (1678–1735), Czech, Jesuit

Alternate spellings: Slaviczek, Slawicek

Chinese name: Yan Jiale

Born in Moravia, Father Slavicek was distinguished in mathematics, music, and the mechanical arts, but was given to bouts of melancholy. He arrived at court in 1717, where he spent much of his time making and repairing watches, clocks, and organs.¹¹¹ With the exception of a few years in Guangzhou, Jiujiang, and Nanchang, he spent his years at the capital.

Father Angelo, Franciscan

Almost nothing is known about this missionary. He has been identified as either Father Angelo-Maria Pavese (d. 1724),¹¹² or Angelo de Borgo San Sero, O.F.M.,¹¹³ both of whom were listed as part of the Mezzabarba legation that arrived in China in December 1720.¹¹⁴ Matteo Ripa writes that in early 1722, he was “appointed interpreter and guide to Father Angelo, the emperor’s watchmaker.”¹¹⁵

Father Valentin Chalier (1697–1747), French, Jesuit

Chinese name: Sha Ruyu

Father Chalier, from Briançon, is one of the most famous of the horologists and automata makers at the Chinese court, where he arrived in 1728. A letter written by Father Amiot in 1736 states that it was Chalier who invented the famous clock that signaled the night watches, a veritable “masterpiece,” according to Amiot.¹¹⁶ In one of his own letters, Chalier tells of an incredible piece that he had just completed:

I have made a clock 4½ ft. high and 3 ft. wide which marks hours, minutes and seconds in Western style, and strikes quarters as a repeater . . . The machine has been finished now four months, and the emperor is delighted with it. He keeps it in his own apartments. Nothing has been spared for the ornament of it and the case and dials are magnificent. While it was being made he often had me bring to him the new pieces, and seeing the multitude of arbours, cogs and pins he vowed that he would never have thought what he had asked me to do would have been so difficult. When it was finished he invited the princes and grandees to come and look at it, explaining its works as if it was something of his own invention. They complimented him highly, attributing to him all the execution of it, and the cream of the joke was that I had to speak in the same strain as all the rest of them.¹¹⁷

Brother Coadjutor Gilles Thébault (1703–66), French, Jesuit

Alternate spelling: Thibaud, Thibault, Thébaud, Thébaut

Chinese name: Yang Zixin

Brother Thébault, born at St-Malo, arrived in China in 1738. He learned watchmaking before entering the Order. He used his skills in horology and mechanics by designing a lifelike lion that could walk about a hundred paces for the emperor. Amiot, in a letter of 1754 wrote of the lion:

Father Thibault happily had just finished a lion automaton that takes steps like ordinary beasts and that hides in its bowels all of the springs that move it. It is amazing that with only the most common horological principles this dear Father could, on his own, invent and combine all this artifice into one machine that is the most elevated of all mechanics. I speak on having seen it and having made it walk in the palace. . . . [I]t is the ultimate perfection.¹¹⁸

He later made a second lion and a tiger that were mentioned in a letter by du Ventavon to du Brasard, dated September 15, 1769: “Father Thébaut, who had been dead some time before I arrived,¹¹⁹ made a lion and a tiger that walked thirty to forty steps on their own.”¹²⁰ These automata thoroughly delighted the emperor.

Thébault worked in the horological workshops in Beijing during the reigns of the Kangxi and Qianlong emperors.¹²¹

Father Sigismondo di San Nicolà (1713–67), reformed

Augustinian,¹²² and Missionary of the Propaganda

According to a letter written by Father Amiot in 1754,¹²³ Father Sigismondo di San Nicolà constructed an elaborate android. With Thébault, he also worked on an automaton clock that was presented to the Qianlong emperor on the

occasion of his mother's sixtieth birthday in 1752.¹²⁴ In 1774, Amiot wrote of Sigismond that he found “the means to introduce himself into the Palace under the title of horologer, serving as a machinist. Since he had much spirit and a great deal of talent as well, he made himself appreciated there and died in the service of the Emperor.”¹²⁵

Father Nicolas-Marie Roy (1726–69), French, Jesuit

Very little information exists on Father Roy, a Frenchman who left for the mission at Beijing in 1756 to give assistance to Father Benoît in horology.¹²⁶

Father Pierre-Martial Cibot (1727–80), French, Jesuit

Chinese name: Han Guoying

Father Cibot was born at Limoges and entered the Jesuit order at the age of sixteen. He studied the sciences of astronomy and mechanics as well as languages. He left for China in 1758 and arrived in Beijing in 1760. Cibot was hard-working, zealous, and successful in whatever he chose to undertake: astronomy, languages, history, or mechanical arts.¹²⁷

He worked for four years at the palace on a large water clock that had, in addition to water jets, bird songs and figures that moved.¹²⁸ He said later, “I have been the fountain-maker and machinist for five years at the Versailles of China and since the victories of the emperor, I have become the gardener and florist.”¹²⁹ Portraits of him by the Italian Jesuit artist Giuseppe Panzi in 1780 still exist.¹³⁰

Father Jean-Mathieu de Ventavon (1733–87), French, Jesuit

Chinese name: Wang Dahong; Matou

Jean-Mathieu de Ventavon arrived in Beijing in 1766, where he served the emperor for twenty years, having taken over as palace mechanic from Thébault, who had died that year. He was trained as a clockmaker, and he constructed mechanical curiosities for the Qianlong emperor and as well repaired clocks. In a letter of September 1769, he mentions some interesting automata, two earlier pieces by Thébault and one of his own current projects:

I have been called near the Emperor [Qianlong] as horologer; it would be better if I were referred to as a machinist because, in effect, it is not clocks that the emperor demands of us, but curious machines. . . . Now I am charged with making two figures that carry a vase while walking. I have worked on them for eight months, it will be another year for me to complete the work. It is such work that has given me the occasion to see the Emperor many times.¹³¹

De Ventavon's work pleased the emperor, as evidenced in a letter of Father Bourgeois of October 30, 1769.¹³²

Father de Ventavon mentioned working with a missionary of the Propaganda.¹³³ He reported in a letter of 1769 that he was kept very busy and had no time to study the Chinese language.¹³⁴

In the last years of his life, he was required to make an ingenious automaton that could write in Manchu. According to a letter of November 17, 1786, by the Lazarist Joseph Raux to Bertin, de Ventavon made an automaton that wrote Manchu at the emperor's request. He also set it up so that it could write in Mongolian.¹³⁵

I remember in Paris Monsignor spoke to me one day of a machine made by the English, which wrote Chinese characters in praise of the Emperor. One year, the grand Prince asked M. de Ventavon whether he could make a machine, like the one mentioned, that could write in Manchu: M. de Ventavon tried and succeeded, much to the great satisfaction of the Emperor. M. de Ventavon also has set up the machine for Mongolian characters. I believe it will please Your Grace the insertion here of a copy or two of the complete works of the “little english” [machine], in Chinese, Manchu, and Mongolian. Shortly, it will know how to write in Tibetan.¹³⁶

Owing to the services he rendered to the imperial family, de Ventavon had certain influence at court that he used for the benefit of the mission.

Father Hubert de Méricourt (1729–74), French

Chinese name: Li Junxian

Upon his arrival in Beijing with Father Panzi, the painter, in January 1773, Father Méricourt worked as a horologer and mechanic at the court with Fathers de Ventavon and Archange.¹³⁷

**Father Arcangelo-Maria di Sant’Anna (1729–84), Italian, Carmelite
sent by the Propaganda**

Father “Archange” is mentioned in Benoît’s letter of 1773 as being a horologer at the court, and Amiot’s letter of 1774 lists him as a Carmelite.¹³⁸ However, not much more is known of him. The diagram of the cemetery of the Propaganda at the Xitang (Western Church) shows a missionary by the name of “Archan, Carme déchaussé milanais.” The inscription to the grave marker disappeared in 1900.¹³⁹ Pelliot writes that Archangelo arrived in Beijing by 1764.¹⁴⁰

Charles (or Joseph) Paris (1738–1804), French, Lazarist

Also known as Brother Joseph

Chinese name: Ba Maozheng

Charles Paris studied the mechanical arts in France.¹⁴¹ He was one of four Lazarist missionaries sent to the Chinese court after the suppression of the

Jesuits. He landed at Guangzhou in 1784, arriving in Beijing in 1785.¹⁴² In Raux’s letter of 1786, he mentions that “Father Joseph” had a good many watches to repair at the palace, but that he still had time to construct “a very elegant ‘electric’ machine.” The “Tartar prince” had asked for this for a long time and was most pleased with the result.¹⁴³

In 1787 he was appointed mechanic for the court of the Qianlong emperor, succeeding de Ventavon, who had died in May of that year. Raux’s letter to Bertin of November 1787 informed him of de Ventavon’s death: “As soon as M. de Ventavon has closed his eyes, the Emperor ordered that Father Joseph Paris take his place in caring for the clocks and other machines in the Palace. This good father is as able in clock making as he is deficient in the use of the Chinese language.”¹⁴⁴

Together with the Italian Augustinian Pietro Adeodato da Santo Agostino (see below), who was the last imperial watchmaker, Paris made a writer automaton inspired by those that had been brought to the court some years earlier.¹⁴⁵ It is possible that he was inspired by one such writer automaton made by the firm of Jaquet-Droz of La Chaux-de-Fonds. Jean-Joseph Ghislain (1751–1812), a French Lazarist who traveled with Paris to Beijing, made note of Paris’s accomplishments (sometime after Paris’s death in 1804): he made large clocks, two large carillons, one small and one large organ, and a clock that could run for three months without needing winding. In particular, he tells of an automaton, five feet in height, that was able to write lines in praise of the emperor in Chinese, Tartar, and Mongol.¹⁴⁶ This was quite possibly the same writer automaton referred to by Raux in his letter of 1789 to Jean-Baptiste Bertin (1719–92), the correspondent and protector of the French missions at Beijing,¹⁴⁷ in which he writes that the emperor ordered “Father Joseph and a Father of the Propaganda to make a machine that writes characters similar to the one of the English.” Raux’s later letter of 1790 tells of the emperor’s satisfaction in the object that the two priests spent over a year constructing.¹⁴⁸

He worked with the Swiss horologist Charles-Henri Petitpierre, who was with the Dutch embassy of 1794 under Isaac Titsingh.¹⁴⁹

Emanuel Conforti (b. ca. 1754), Italian, Congregation of St. John the Baptist

Very little can be discerned about Emanuel Conforti, who was in the service of the emperor as watchmaker from 1785.¹⁵⁰ Born in Genoa, Conforti arrived in Macao in 1783 and Beijing in 1785 along with the Lazarists Raux, Ghislain, and Paris. He returned to Europe in 1811 when the Xitang was closed.¹⁵¹

Pietro Adeodato da Santo Agostino (ca. 1756–1822),¹⁵² reformed Augustinian

Alternate spelling: Adeodati; Deodati¹⁵³**Chinese name: De Tiansi**

A native of Naples, Adeodato entered the service of the emperor in 1785.¹⁵⁴ He was one of four Italian priests sent by the Propaganda (two were of the Congregation of St. John; two were Augustinian) who chose to leave China as the result of an imperial edict of 1811 that specified a number of new regulations for the missionaries.¹⁵⁵ He was a clockmaker and mechanic and attained the position of mandarin of the sixth rank. He served as interpreter for, and offered assistance to, John Barrow, the comptroller of the Macartney embassy to China, and to Dr. James Dinwiddie, the embassy's mathematician and mechanic, in 1793, when the latter men remained at the Yuanmingyuan to set up the presents from King George III of England to the emperor of China.¹⁵⁶

Adeodato incurred the anger of the emperor in 1805 when packages he sent intended for Rome were intercepted by the Chinese and were found to contain maps. While the maps purportedly showed ecclesiastical divisions within the Chinese empire, they were interpreted as “evidence of a planned rebellion,” and Adeodato was banished to Jehol. In 1811, he was deported to Europe.¹⁵⁷

Adeodato's expulsion ended the missionary involvement in clock making at the Chinese court. By this time, Western-style clocks were not for the exclusive use of the emperor or his court, as manufacture by Chinese craftsmen outside of the palace workshop made pieces more generally available. Merchant activity had established the trade, and a number of clocks and watches from Europe were becoming available through traders at Guangzhou.

In practical as well as philosophical terms, the European mechanical clock was of great value to the missions and was far from being merely a technological artifact. It figured prominently in both Jesuit proselytization strategies: using science to gain access to influential scholars, and Ricci's form of cultural accommodation, which allowed the practice of certain Chinese rites in order to make the doctrines of Christianity seem less foreign to native converts. The clock proved to be an ideal choice as a gift for the Chinese emperors, for they collected these objects in great numbers and eventually established imperial workshops for their manufacture. Clock making, along with skills in other areas such as astronomy, contributed to the favor that the Jesuits enjoyed, giving them access to the Chinese emperor that would allow them, in theory, to convert the empire of China from the top down.

But the clock's value to the Jesuits was not only that it promoted European science: it also represented the higher principles of the faith and had strong associations with Christianity, concepts that would have been familiar to the Jesuits and appealed to them. The clock gave order to chaos, and the relationship between the clockmaker and the clock was analogous to that

between God and creation. In bringing the technology to China, teaching the skill to the Chinese, and making clocks themselves, the Jesuits were serving a higher purpose. “Divine Wisdom,” according to Bonaventure, “[is] to be found in the illumination of the mechanical arts, the sole purpose of which is the *production of works of art*.”¹⁵⁸ Thus, by offering to instruct the Chinese in clock making, the Jesuits were also aiding in their conversion to Christianity: making clocks became a spiritual exercise.

In this illumination we can see the . . . *Incarnation of the Word* . . . and the *union of the soul with God*. And this is true if we consider the *production*, the *effect*, and the *advantage* of the work, or if we consider the *skill of the artist*, [and] *the quality of the effect produced*.¹⁵⁹

It could not have been coincidental that theologians placed an emphasis on mechanical principles to illustrate higher matters of the faith and that the Jesuits similarly placed a emphasis on these same arts in their proselytization strategies.

But the successes the Jesuits had in securing a place for the missions using such skills as clock making contributed to intermissionary rivalries that fueled the rites controversies of the seventeenth and eighteenth centuries. Debate and criticism of Jesuit activity in China, specifically Ricci’s cultural accommodation policies, are also revealed through the Jesuits’ roles as clockmakers and mechanics. Conflicts in ideology between technology and catechism, and indecision whether to serve the emperor’s needs or not, affected the makers at court. The mechanical clock may thus be seen as a microcosm of Jesuit activity in China, but more importantly, it expressed the scientific and religious aspects of European culture that the Jesuits sought to introduce to the Chinese court.

“Ode to a Self-Sounding Bell”

The Chinese Interest in Elaborate Clockwork

As we have seen, the Chinese court’s interest in European clocks and automata began in the late Ming dynasty (1368–1644) during the reign of the Wanli emperor (r. 1573–1620) when the Jesuit missionary Matteo Ricci (1552–1610) presented two clocks to the emperor in 1601. One of these chimed the half- and quarter-hours. The clock, on its journey to Beijing, was the object of much attention; upon its arrival at the capital, it was installed in a specially constructed tower.¹

Such was the introduction of Western clockwork to the Chinese court and the beginning of an intense interest in what came to be known as “self-sounding bells.” Clocks were valuable commodities in the seventeenth and eighteenth centuries and were considered very collectible during the reigns of the Kangxi (r. 1662–1722) and Qianlong (r. 1736–95) emperors. Their desire to build the imperial collections was known to both Chinese and Europeans alike, who selected clocks as gifts or tribute to these courts, and it led to the development of a native clock-making industry, thus introducing important mechanical principles to the Chinese.

Part of the appeal of these clocks lay in their costly materials and in their accessory functions of music, bells, and mechanized animated elements. But why were the emperors so interested in elaborate clockwork when there were so many other examples of Western art and technology available to them? What special appeal did clockwork have for them? And what did they signify to the Chinese? In answering these questions, this chapter will consider the circulation of clocks within the imperial world of “things” by examining how these objects were acquired, how they were used and by whom, and the effect that this imperial interest had on the development of the manufacture of these items by the Chinese both inside and outside the court circle.

CLOCKS AT THE CHINESE COURT

The Jesuit custom of giving clocks to the court, which began at the end of the Ming dynasty, continued into the Qing period when, in 1653, the Shunzhi emperor (r. 1644–61) was presented with a small European clock that sounded the hours on its own. Jesuit writings report that he showed great affection for this clock, keeping it with him at all times and ordering larger copies of it to be made.² However, it was under the reigns of the Kangxi and Qianlong emperors that the imperial collection of clocks and watches grew to vast numbers.

Kangxi held more than a passing interest in Western science, technology, and art, and he encouraged the Jesuit presence at court: they acted as advisors to the emperor in such areas of Western learning as astronomy, cartography, and artillery and provided expertise in areas unknown to the Chinese.³

The Kangxi emperor's keen interest in Western art was noted by both Chinese and European observers. Gao Shiqi (1645–1703), his personal secretary and confidant of many years, wrote in 1703 of the emperor's growing collection of Western art that he had noted over the course of several visits to the emperor at the Changchunyuán and the imperial palace at Beijing.⁴ In addition to collecting, Kangxi also took a more active role in understanding Western art and learned how to play a tune on the harpsichord under the tutelage of Tomás Pereira (1645–1702).⁵ But nothing could compare to the special enthusiasm he felt for European clocks and watches.

Kangxi built a collection of elaborate clockwork that was known for both quantity and quality. One particularly descriptive account comes from the missionary Matteo Ripa, who wrote in his *Memoirs* of the departure from Beijing for Moscow of Count Leon Vasil'evich Ismailov, the ambassador from Peter the Great, on March 13, 1721, with a number of valuable gifts from the Chinese emperor to the Russian sovereign. Although Ripa does not mention in detail the gifts sent, he does relate one incident that showed “the immense wealth of the Chinese monarch.”

One day I was commanded to show to the ambassador and some of his attendants his Majesty's collection of clocks and watches. On entering the room, Count Ismailof was so astonished at the number and variety of these articles displayed before him, that he suspected they were counterfeit. I then requested him to take some of them in his hand, and having done so, he was surprised to find them all perfect. But his astonishment increased still more when I told him that all the clocks and watches he now saw were intended for presents, and that his Majesty possessed a still greater number, placed in various parts of his palaces for his own use.⁶

In his pursuit of learning about Western science, and undoubtedly fired by his own enthusiasm for his collection, Kangxi also made an effort to learn

something about the theory and practical aspects of clock making and mechanics.⁷ As the collection grew, it became necessary to find a means to maintain and repair his pieces. Furthermore, Kangxi's appetite for these objects could not be satisfied by the imported pieces alone. Thus, in the late seventeenth century, the emperor established a clock-making workshop within the Forbidden City that was to be staffed by the Jesuits and Chinese workmen. John Bell (1691–1780), a native of Scotland who secured a place on the Ismailov embassy, wrote in 1721 that “the making of clocks and watches was lately introduced, under the protection of the present Emperor; who, at his leisure hours, amuses himself with whatever is curious either in art or nature.”⁸ Although this workshop was only one of many set up at the palace to produce goods for imperial use, ultimately it would prove to be the most significant: it allowed the Jesuits to introduce yet another (and highly practical) area of European science and technology to the Chinese that was soon disseminated to other parts of the country with the growth of a native clock-making industry. The Jesuits were eager to tell of Kangxi's wholehearted enthusiasm for European-style clocks, for it confirmed their successes in China by allowing them to insinuate themselves further at the court in keeping with Matteo Ricci's strategy of using science to promote Christianity. Thus we find in the late-eighteenth-century Jesuit work *Mémoires Concernant l'Histoire, les Sciences, les Arts, les Moeurs, les Usages, &c. des Chinois* that Kangxi not only collected European timepieces but himself said, “Since I have reigned, having learned from the Europeans the method to make these springs, I have had hundreds, thousands of these clocks made that mark the time very accurately.”⁹ European science and technology (and, by extension, Christianity) had now fully penetrated the court circle.

It was in the hope that his collecting interest in elaborate clockwork would be passed to subsequent generations that Kangxi presented each of his children with several chiming clocks.¹⁰ He reportedly wrote to them,

You, still young, have for your amusement, ten or twenty of these clocks that sound by themselves, and that I have given you. Do you not consider yourselves very fortunate? You must therefore eternally remember with gratitude the advantages accumulated that have been passed down to you by your ancestors and your father.¹¹

Little is known of the interest that Kangxi's son, Yinzhen, who would come to rule as the Yongzheng emperor (r. 1723–35), had in European-style elaborate clockwork. His reign was comparatively short, but in that time he did show an interest in some Western things, particularly painted enamels on metal. His poetry on the subject of clockwork suggests that he was an admirer of these objects, referring to them as “treasured” and “refined works.”¹² However, it

was Yongzheng’s fourth son, the Qianlong emperor, who was as enamored of *zimingzhong* as his grandfather Kangxi had been. It was under his reign that the collection would reach its height, built on a substantial foundation Qianlong had inherited when he took the throne in 1736. While it is difficult to know exactly how many clocks were in the collection at this time, the observations by the French Jesuit Valentin Chali r (1697–1747), a horologist and maker of automata at the Chinese court, suggest that the collection was already quite large:

As for European clocks, the palace is filled with them. Watches, carillons, repeaters, organs, . . . different kinds, large and small, there are more than four thousand by the best masters of Paris and London, a large quantity of which has already passed through my hands for repairs or cleaning. In this way, I have obtained as much theory as any watchmaker in Europe, for it is difficult for anyone to have seen as much as I have. A little more practice in my youth would have been of great use now.¹³

It can be well imagined that in Qianlong’s time, “the passage of hours was marked by a fluttering of enamelled wings, a gushing of glass fountains and a spinning of paste stars, while from a thousand concealed and whirring orchestras, the gavottes and minuets of London rose strangely into the Chinese air.”¹⁴

The reign of the Qianlong emperor, the longest in Chinese history, continued the tradition set out by the Kangxi emperor of keeping Jesuits at court to assist in the sciences, especially astronomy¹⁵ and mapmaking, and the arts, including painting and architecture. The Jesuits were put to work producing a number of exceptional objects that were unsurpassed in terms of originality and complexity of construction. As Jean-Joseph-Marie Amiot noted in 1754:

Since the Missionaries were established here, there has not been an Emperor who has profited more from these services than the reigning Emperor; and there has not been one who has mistreated them more, and who has supported the most crushing blocks against the religion they profess. However, it was to please him that the late Father Chali r invented the famous alarm clock, a work that, in Europe, would pass for a marvel, or at the least for a masterpiece of art: Father Beno t made, a few years ago, the celebrated machine of the Saint Pierre valley, to provide the most varied and enjoyable jets of water that decorate the surroundings of a European house, built on the design and under the direction of Brother Castiglione: [and] Brother de Brossard made, in glass, the works of the best taste and of the most difficult execution, works that shine today in the throne room with the most lovely pieces that have come from France and England.¹⁶

The Qianlong emperor was an enthusiastic collector whose legacy is evident today in the collections of both the Palace Museum, Beijing, and the National Palace Museum, Taipei. So central was his role in their formation that he has been given the honor as “the creator of China’s national patrimony.”¹⁷ In expanding the imperial collections, Qianlong amassed a substantial number of elaborate clocks and watches made in both Europe and China. Today more than one thousand pieces are extant in Beijing alone; this remaining total, given the decades of upheaval and turmoil in China particularly from the mid-nineteenth to early twentieth centuries, suggests that Chaliér’s 1736 approximation of over four thousand pieces of European manufacture alone may have been accurate.

Art objects were an expression of Qianlong’s imperial status and power. In no other area is this shown more clearly than in his passion for clocks and watches. These objects took a prominent place in a wide range of writings of the period from documents relating to court procedures to imperial poetry and popular fiction.

It was during the Qianlong period that clocks were included for the first time in official court documents. In 1759, the emperor appointed a commission to formulate the regulations for ceremonial items for the dynasty. The resulting work, the *Huangchao liqi tu shi* (Illustrated regulations for ceremonial paraphernalia of the Qing dynasty), published in 1766,¹⁸ covers in eighteen chapters ritual vessels, astronomical and other instruments, costumes, uniforms, official insignia, and weapons. The work is profusely illustrated with a description accompanying each entry. Included are several objects of European origin: a telescope, a sundial, a large Western-style clock, and a pocket watch and chain. The clock, labeled “self-sounding bell,” or *zimingzhong* (fig. 5), is one *zhang*, six *chi*, and six *cun* in height (over five meters), corresponds to a towering clock that now stands on the west side of the throne in the Jiaotaidian (fig. 6). The pocket watch (fig. 7) is said to be about six centimeters in diameter and two centimeters in thickness. A gilt bronze watch in the Palace Museum, Beijing, matches this rather generalized illustration fairly closely (fig. 8). Made in London in the eighteenth century, it is five and one-half centimeters in diameter, two centimeters thick, and has a remarkably similar chain.

Clocks also figured in the emperor’s personal writings. Qianlong wrote several poems in praise of “self-sounding bells,” following in the tradition of his father and grandfather. Qianlong’s son, the Jiaqing emperor, also wrote about clockwork. In general, the imperial poems on clocks contain four broad themes: these items are clearly identified with the West; their innovative technology was a European development; they work steadfastly and reliably; and China has nothing equivalent. Kangxi’s “Ode to a Self-Sounding Bell” touches on several of these points:

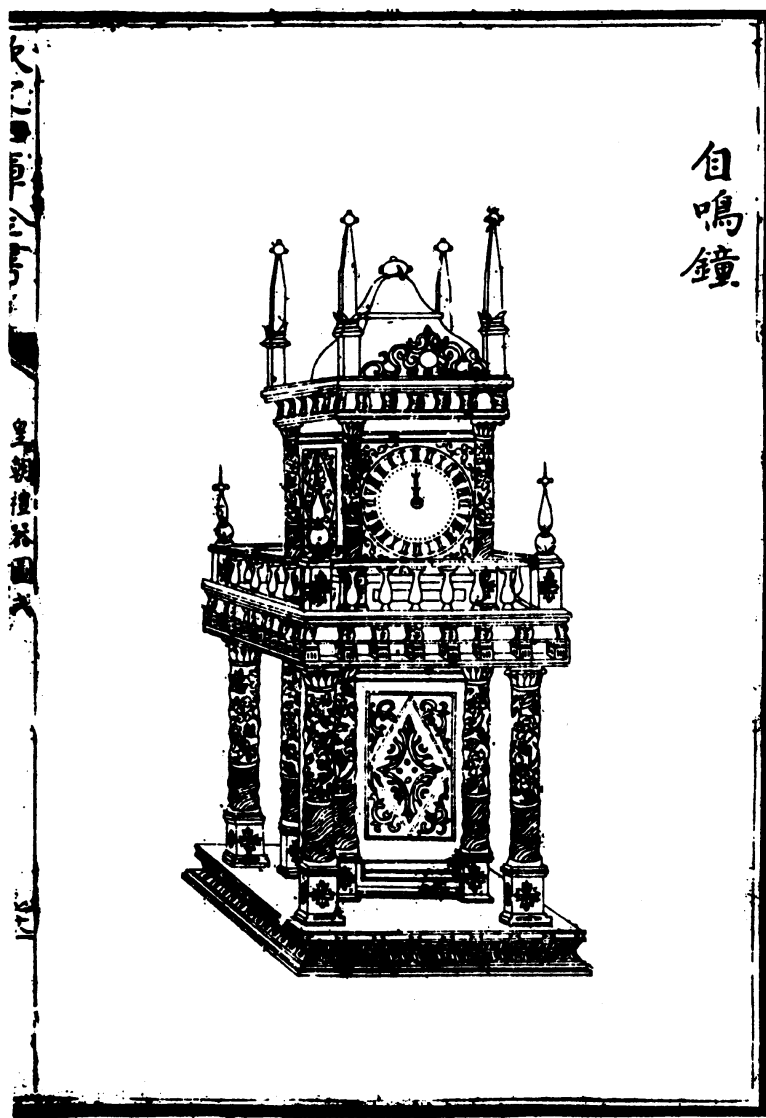


Fig. 5. *Zimingzhong* (self-sounding bell). (*Huangchao liqi tu shi* [1766; Taipei: Shangwu yinshuguan, 1976], *juan* 3, 78a.)

The method originated in the West,
Through instruction we learn the ingenuity.
Wheels move while time revolves,
Hands indicate the change of the minutes.

Those in the red caps can cease announcing the dawn,
A golden bell prepares to announce the time.
In the early morning I diligently work on government affairs,
And am annoyed by the late memorials.¹⁹



Fig. 6. *Zimingzhong* (self-sounding bell), eighteenth century. Height 557 cm. Jiaotaidian, Palace Museum, Beijing.

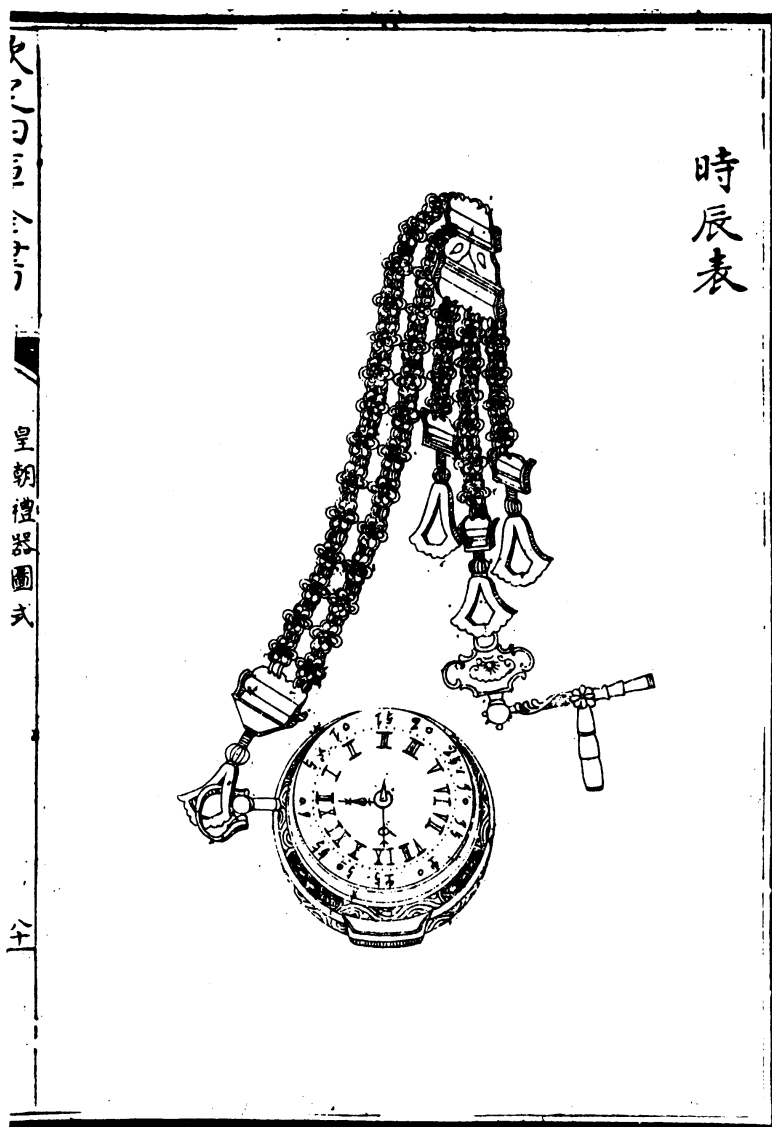


Fig. 7. Watch and chain. (*Huangchao liqi tu shi* [1766; Taipei: Shangwu yinshuguan, 1976], *juan* 3, 81a.)

The poems also show a basic understanding of the mechanical principles involved: wheels, cogs, and springs work in an unceasing and tireless fashion to move the hands of the clock. As Kangxi wrote in another poem:

Day and night its endless movements are superior to those of the
clepsydra,
Winding and unwinding they report the hour.
Yin and yang cannot change its nature,
From a great distance comes two hundred years.²⁰



Fig. 8. Watch and chain. English, signed “Clay,” eighteenth century. Diameter 5.5 cm. Palace Museum, Beijing.

These writings also reveal a passion for clockwork and suggest that for the Qing emperors, clocks held an important place in the imperial world of objects, as more than decorative playthings. Described as “ingenious” and regarded as “treasures,” these clocks joined the ranks of other esteemed objects as subjects of imperial poetry, reaching its height in the Qianlong period. In his “Ode to a Self-Sounding Bell,” Qianlong shows the attention he paid to one particularly interesting elaborate clock:

The unusual treasures arrived by ship,
The talented makers can surpass the palace lotus.
Water and fire cannot illuminate the records,
The autumn equinox moves on unperceived.

The skill of the workmanship surpasses that of nature,
 At the appointed hour, it gives forth a sound.
 The clock indicates the time without error,
 Moving back and forth, the wheels turn.
 It can show morning and dusk,
 The expanding and contracting springs make no mistakes.
 Snatching an arrow, the golden figure is bashful,
 Raising a bowl, the bronze officer points.
 The clock's distinct sounds embody perfection,
 The tunes herald [the time] in a variety of ways.
 If you desire quietude,
 Then you should not wind it up.²¹

In Qianlong's eyes, this clock, like the others in his collection, was notable for both artistry and accuracy: it surpasses anything nature has created and performs its duties reliably, day after day, without cessation. Its wheels and springs move quietly as it marks the passage of time until the appointed hour, when the clock seems to come alive: music sounds and figures appear ringing bells. Such careful observation suggests that Qianlong spent time with this clock, making note of its unique features. This poem also reveals something of the emperor's personality: he jokingly states that if one wishes to enjoy tranquil surroundings, then it is best not to wind this clock!

Qianlong's collection of Western-style clocks and watches grew rapidly in the eighteenth century because of their greater availability, a result of expanded contacts between Europe and China that increased the number of Western goods traveling eastward; the rapid growth of the clock-making industry in Europe, with some pieces specifically designated for the Chinese market; the emergence of a native industry in China; and knowledge in Europe and China of the Chinese imperial fascination with clocks, encouraging their selection as gifts or tribute to the court.

The writings of the Jesuit missionaries stationed at the court had a tremendous influence in Europe. In their efforts to solicit support for the missions, the Jesuits described their successes in penetrating the empire and noted the important role that clockwork had played in placing them at the capital in order to gain access to the Chinese emperors. Clockwork is mentioned in their published diaries and letters as well as in the more comprehensive works on China to which the missionaries contributed. With their abilities in both the oral and written forms of the Chinese language, the Jesuits were able to supply a firsthand knowledge previously lacking in Europe. As a result, their writings were extremely popular and enormously influential: “The idea of China [in the West] took a leap forward once the Jesuit material became available.”²²

The single most important event for the Jesuits in China came when Mat-

teo Ricci reached the Ming court and obtained an imperial audience in 1601. He exploited the Chinese curiosity about Western objects, presenting Wanli with a clock and a watch. This provided the missionaries with the opportunity to make contact with the emperor and other influential scholars, and, it was hoped, make converts to Christianity. The event was responsible for the subsequent achievements of the missions and marked the beginning of nearly two hundred years of Jesuit presence at the Chinese court. Ricci's great success brought attention to the Chinese emperors' rich collections and the usefulness of clockwork in gaining access to the upper reaches of Chinese society.

Ricci's story was first published in 1615 by Nicholas Trigault, who based his work on Ricci's manuscript memoirs.²³ Over the next few years, Trigault's Latin text was translated into a number of other European languages. The information contained in Trigault's account formed the core for other subsequent publications on China in the seventeenth and eighteenth centuries. Among these are Alvarez Semedo's *History of that Great Renowned Monarchy of China* of 1655; Athanasius Kircher's *Description of China* of 1667; Jean-Baptiste Du Halde's mid-eighteenth-century work, *A Description of the Empire of China*; and *Mémoires concernant l'Histoire, les Sciences, les Arts . . . des Chinois*, by the missionaries stationed at Beijing, published in 1776. Emphasized in these writings is the central role the clock played in securing Ricci's position in China.

Father Alvarez Semedo (1586–1658), a twenty-two-year resident of China at Nanjing, was the Portuguese procurator general for the China missions.²⁴ His *History* has been described as “rich [in] observation, as yet unaffected by the later racist or colonialist mythologies,” and the years from 1642 to 1678 saw the publication of several editions in addition to translations into a number of languages.²⁵ Of the reception of Ricci's presents, Semedo wrote that the emperor “did highly prize the pictures of our Saviour and of the Blessed Virgin; [and] he much admired the Harpsicon,” but he was taken by the clock, “a piece of much skill and workmanship” that could “strike the hours of its owne accord.” The missionaries were called upon to put this clock in working order and, having done so, “were received and entertained with all magnificence and courtesie.”²⁶

Kircher's influential description of China is more theological in tone, as evidenced in his account of Ricci's reaching the court. It was through Ricci that “the first way was opened into the Empire of China, unto whom also the blessed success of the Christian Law ought deservedly to be ascribed.” Ricci's gifts to the emperor, including a “Clock both exact and curiously seen,” were in demand in China, “for those things which were now grown common in Europe, were esteemed as Miracles in China, being there as yet both unseen and unheard of.”²⁷ This story again appeared in the eighteenth century in Du Halde's comprehensive survey, *A Description of the Empire of China*, published in at least ten editions in six countries between 1735 and 1770. Du Halde wrote that “P. Ricci owed the favourable Admission he obtained into the Emperor's

Court to a clock and repeating watch.” He added that the missionaries catered to the emperor’s taste in these items and sent for “great Quantities of this sort of Works,” of the best workmanship so that the palace was soon filled with them.²⁸

These writings, with their focus on Ricci’s story of success, brought attention in Europe to the Chinese emperors’ attitudes toward the Jesuits and clockwork’s use in gaining access to the court. With the growing European interest in the Far East in the seventeenth and eighteenth centuries, such accounts were read with interest. Because China to most Europeans was unknown and exotic, Ricci and Semedo, given their long tenures in China, were seen as authorities on the Celestial Empire, and their writings were therefore highly influential. The emphasis on the usefulness of clocks in gaining access to the Chinese emperor could not be ignored, and it is no coincidence that other European groups seeking imperial favor chose clockwork to aid them.

Owing to Ricci’s success with using clocks and watches to benefit the missions, it is not surprising that timepieces and mechanical curiosities were often chosen as presents for the emperor by members of foreign embassies to China. Gifts for the emperor were an important component of the embassies. One member of an ambassadorial entourage to China remarked that “the Chinese had no other idea of an Embassy than that of a visit with presents on some solemn festival.”²⁹

A number of European embassies were sent to the Chinese court in the seventeenth and eighteenth centuries. These were as follows:³⁰

- Dutch embassy under Peter de Goyer and Jacob de Keyser, 1656
- Second Dutch embassy under Pieter van Hoorn, 1667
- Portuguese embassy under Manoel de Saldanha, 1668–69
- Second Portuguese embassy under Bento Pereira de Faria, 1678
- Third Dutch embassy under Vincent Paats, 1686
- Russian embassy under Isbrant Ides, 1692–93
- Second Russian embassy under Vasil’evich Ismailov, 1720–21
- Embassy from the pope under Carlo Ambrogio Mezzabarba, 1720–21
- Third Portuguese embassy under Senhor Pacheco, 1753
- British embassy under Lt.-Col. Charles Allen Cathcart (Cathcart died on route, and the embassy was terminated), 1788
- Second British embassy under George Lord Macartney, 1793
- Fourth Dutch embassy under Isaac Titsingh, 1794–95
- Third British embassy under Lord Amherst, 1815

Of the four embassies sent to Qianlong’s court in the late eighteenth century, three carried timepieces as gifts for the emperor and high-ranking Chinese officials. The Macartney and Titsingh embassies are of greatest interest,

for not only did they bring clocks and watches as presents but also saw fit to include a watchmaker or mechanic as part of their entourage (the Cathcart embassy did not reach China and thus will not be considered here).³¹ Among the foreign embassies to China, the Ismailov embassy of 1720–21 was the first to present clocks and watches to the emperor, but in general clocks formed a minor part of the gifts given to the Kangxi emperor, probably because neither Portugal nor Holland, the two other countries that sent embassies to the Chinese court during this period, manufactured or traded in such objects.³²

THE MACARTNEY EMBASSY

The embassy from Britain under George Lord Macartney (1737–1806) was sent to China in September 1792 (arriving in China 1793) to negotiate a treaty that would allow a representative to reside at Beijing, increase the level of trade at Guangzhou, and open new ports for trade.³³ Several members of the embassy published firsthand narratives of their observations and experiences; among them are John Barrow (1764–1848), the comptroller to the embassy; John Christian Hüttner (1766–1847), a German doctor attached to the embassy who served as the tutor to the secretary’s son; Samuel Holmes, a sergeant-major, and a guard on the embassy; and Aeneas Anderson, Macartney’s valet.³⁴ The best-known account is that by Sir George Leonard Staunton (1737–1801), secretary and minister plenipotentiary to the embassy. His work, *An Authentic Account of an Embassy from the King of Great Britain to the Emperor of China*, saw publication of around fifteen editions in eight countries between 1797 and 1832. Much of Staunton’s work comes from Macartney’s papers. Macartney’s journal itself was published with annotations by J. L. Cranmer-Byng in 1963.

This was the first embassy sent from Great Britain to reach the Chinese court. While Macartney was successful in obtaining an audience with the Chinese emperor, the overall results of the embassy were almost complete failure. Not only did the embassy not achieve its intended goals, it did little to change Qianlong’s perception that England was nothing more than a tributary nation that was sending a congratulatory entourage in honor of his eightieth birthday.³⁵

An important element of the embassy were the gifts for Qianlong that Macartney carried with him on behalf of George III. Owing to the embassy’s strategic significance in Sino-British relations, these items were of central importance and thus much attention was paid in both British and Chinese writings to the selection, care, and reception of the gifts.³⁶ Prominent among these articles were clocks and watches.

The choice of presents was given considerable thought and was designed to impress upon the Chinese the superiority and ingenuity of British manufactures. These gifts would subsequently, “establish a taste for them among the

people, to encourage a demand for them and promote their future sale.”³⁷ The embassy would not

offer trifles of momentary curiosity but little use. His Britannic Majesty has been therefore careful to select only such articles as may denote the progress of Science and the Arts in Europe, and which may convey some kind of information to the exalted mind of his Imperial Majesty, or such others as may be practically useful. The intend [*sic*] not the presents themselves is of value between Sovereigns.³⁸

Thus, the value of the gifts lay in what they represented: for the British, the clocks and other items were to illustrate not only European achievement in inventions but their cultural superiority as well.

Sir George Staunton published the list in his account of the embassy. He wrote, “An ordinary catalogue could neither point out their qualities, nor their worth; nor be comprehended by any translation.—They were, therefore, described by circumlocution, in all the pomp of oriental style.”³⁹ The final selection included saddles, muskets, sword blades, woolens, an air pump, a pair of glass lustres, celestial and terrestrial globes, a telescope, and clocks and watches, all of high quality with some items coming from the aborted Cathcart embassy of 1788.⁴⁰ Scientific instruments and objects showing technical know-how were of central importance for the embassy. Macartney was well aware of the previous Jesuit successes in penetrating the empire through the use of European science. He refers to the “avidity with which their lessons and exhibitions were received” and thus believed it wise to “carry with us expensive apparatuses of different kinds and of the latest inventions.”⁴¹

In May 1792, Dr. James Dinwiddie, “a Scotch Philosopher”⁴² and the “mechanic” (scientist) for the embassy, began preparing a list of gifts, which included mechanical devices as well as the equipment he would need to conduct scientific experiments while in China.⁴³ On June 10, he suggested that Macartney purchase, among other articles, a planetarium and curious watches.⁴⁴ In addition to Dr. Dinwiddie, who was knowledgeable in the sciences, the members of the embassy also included two others who were mechanically inclined: Victor Thibault (also spelled Thébaud), a mathematician and instrument maker; and Charles-Henri Petitpierre (b. 1769), a watchmaker originally from Switzerland.⁴⁵

This selection of gifts, which was intended to introduce British ingenuity to the Chinese, must have been well known in England. A contemporary cartoon by James Gillray entitled *The Reception of the Diplomatie and his Suite at the Court of Peking*, published in September 1792 only one week before Macartney’s embassy sailed, shows a European ambassador and his entourage at the Chinese court presenting a wide variety of goods, including a bad-

minton racquet and shuttlecock, a model of a hot-air balloon, a clock, and some mechanical toys, to a rotund emperor seated on a cushion who smokes a long, slender pipe. The ambassador is on bended knee presenting the letter from the king to the Chinese ruler (fig. 9).⁴⁶

The original budget for the presents was to be £10,000 but the final cost of £15,952, borne by the East India Company, far exceeded the estimate.⁴⁷ Macartney purchased an additional £3,582 worth of gifts in Guangzhou.⁴⁸ These were to be presents for the emperor's sons and eldest grandson, as advised by Father Grammont in a letter of May 30, 1793. In addition, Macartney himself felt the need to present the emperor with a gift, but the principal gifts from England were already cataloged as coming from King George III. He chose for this purpose clockwork. "Luckily," he wrote, he was able to purchase from Captain William Mackintosh, an employee of the East India Company and a private trader in China, "valuable presents" in the form of an additional fifteen pairs of "watches of very fine workmanship, which [Mackintosh] was persuaded to cede me at the usual estimate of profit upon things of this kind brought for sale from Europe to Canton [Guangzhou]."⁴⁹ The cost of these watches came to £2,399; however, only one pair, valued at £472, was given to the emperor.⁵⁰

The gifts were conveyed on the *Hindustan*, one of the East India Company's fastest ships, under the command of Mackintosh.⁵¹ When the embassy arrived at Guangzhou in south China, it was believed that the mechanical pieces were too large and delicate to transport by road to the capital of Beijing, and thus they were sent directly on one of the ships to Tianjin, "approaching . . . as near as possible to the residence of the Emperor of China."⁵²

The emperor was at his summer retreat at Jehol (Rehe), built in 1703 and located some 160 kilometers to the north of the capital. He intended to remain there to celebrate his eightieth birthday, which fell on September 17, 1793. The embassy, therefore, would be received at that residence. The embassy arrived first at Tianjin, and from there traveled to Beijing before making the trek to Jehol. Macartney made the decision to leave some of the presents at Beijing and the Yuanmingyuan (Garden of Perfect Brightness), the emperor's summer palace just outside of the capital about twelve kilometers northwest of Beijing, as it was believed some of the more delicate pieces would suffer irreparable damage if allowed to go all the way to Jehol.⁵³ The transportation of the gifts was a complicated affair. As Staunton recounted:

The presents and baggage, which hitherto had come by water, were now to be conveyed by land to the Emperor's autumnal palace. Such as were liable to receive damage by the jolting of vehicles without springs, were destined to be carried by men; and from a pretty nice calculation it was found, that about ninety waggons, forty hand-barrows, two hundred



Fig. 9. James Gillray, *The Reception of the Diplomatique and his Suite at the Court of Pekin*. Published September 14, 1792. (*The Works of James Gillray from the Original Plates* [London: Henry G. Bohn, 1851; rpt. New York: Benjamin Blom, 1968].)

horses, and nearly three thousand labouring men would be wanted for this business.⁵⁴

Temporary buildings were erected to house these objects while a team of workmen was left at the Yuanmingyuan to see about arranging the “most magnificent” of the gifts. The terrestrial and celestial globes were to be placed on either side of the throne; the lustres were to be hung from the ceiling; the planetarium was to be placed at the north end of the room; and at the south would be placed Vulliamy’s clocks along with the barometer, Derbyshire porcelains, and Fraser’s orrery.⁵⁵ Dinwiddie, Petitpierre, Thibault, and Barrow⁵⁶ were left with some Chinese workmen to set up the presents and therefore did not accompany the embassy to Jehol.⁵⁷ Just prior to his departure from China at the conclusion of the embassy, Macartney stopped at Beijing and had the remaining gifts sent to the Yuanmingyuan on September 28. Petitpierre and the others, who had stayed at the Yuanmingyuan for the dura-

tion of the embassy, were to instruct the missionaries at the court in the care of the pieces after the embassy had departed.⁵⁸

After receiving the embassy at Jehol, the emperor stopped at the Yuanmingyuan on his way back to Beijing to inspect the presents left there. Staunton noted Qianlong's great pleasure with them:

He was impatient to view the presents that the Ambassador had left there when he went to Zhe-hol. His Imperial Majesty examined them with an attention far exceeding that of a person who would think of “the trouble of turning his head to view them.” He seemed, indeed, much gratified with the sight of most of them; and ordered silver to be distributed among the workmen who had been occupied in arranging them. Several of the instruments and machines were tried in his presence.⁵⁹

Staunton's observations of the emperor's interest in the British gifts contrasted sharply with Qianlong's own writings on the subject. In his letter addressed to George III, sent with Macartney on his return to England, the emperor wrote:

The Celestial Empire, ruling within all four seas, . . . does not value rare and precious things. Now you, O King, have presented various objects to the throne, and mindful of your loyalty in presenting things from afar, we have specially ordered the Yamen to receive them. In fact, the virtue and power of the celestial Dynasty has penetrated afar to the myriad kingdoms, which have come to render homage, and so all kinds of precious things from “over mountain and sea” have been collected here, things which your chief envoy and others have seen for themselves. Nevertheless, we have never valued ingenious articles, nor do we have the slightest need of your country's manufactures.⁶⁰

In this oft-quoted passage, Qianlong claims to have “never valued ingenious articles” nor to have “the slightest need” of England's products, yet for years he had jealously collected hundreds of that country's manufactures in the form of elaborate clockwork. This letter, of course, should not be read too literally: it is obvious that in rejecting British articles, Qianlong was rejecting British trade. However, this letter also offers other subtle readings. It has been seen—wrongly, I believe—as evidence of Chinese “backwardness”: in failing to see the “value” of the gifts, the Chinese revealed a basic inability to understand the significance of the technology involved, and this in turn threatened their perceived notion of cultural superiority.⁶¹ The letter may also be viewed as a rejection of, not British trade, but the Macartney embassy, with which these objects came to be associated. Through Macartney's exaggerated claims about the complexity of some of the presents Qianlong had grown distrustful

of Macartney and questioned his sincerity. This led to some serious doubts about the embassy as a whole.⁶² In the end, these examples of British technology and ingenuity had a significance far beyond Macartney's expectations: they offer insight into the clash of cultures and highlight the misunderstandings that characterized this embassy as a whole.

THE TITSINGH EMBASSY

The last Dutch embassy to China, under the command of Isaac Titsingh, in 1794–95, also paid tribute to the Qianlong emperor with gifts of clocks and automata. And, like the previous Macartney embassy, the entourage also included the clockmaker Petitpierre, who stayed on at Macao when Macartney returned to England and then joined with Titsingh. The Dutch took, among other horological pieces, two complicated and “superb” clocks purchased from Thomas Beale.⁶³ They were English-made automata that measured two meters in height and were equipped with a fortune-teller, birds, and a butterfly. They were purchased for six thousand pounds the pair and had arrived earlier on the *Hindostan*.⁶⁴

These presents were to be transported overland and, as it was now early winter, had to be packed carefully lest they should fall. On November 13, a number of Chinese officials came to see these two mechanical pieces, as well as the other items that were to be presented to the emperor on behalf of the embassy, and then they were packed. Unfortunately, en route to Beijing, the pieces were dropped on the frozen ground, destroying one entirely and severely damaging the other. It was then discovered that the packing had been less than satisfactory. In such a condition, the gifts could not be given to the emperor.

Petitpierre, who, as a member of the Macartney embassy, was in charge of clocks and watches and was now a member of the Titsingh embassy, offered to fix the damaged piece. He was twice offered the services of three Chinese clockmakers from the court. Petitpierre refused because he could not communicate with them and requested the aid of some of the missionaries at court instead.⁶⁵ The pieces were brought to the imperial palace at Beijing; work started in late January and ended on February 14, 1795.⁶⁶ When the mechanical piece was finally repaired, Father Raux declared that he was “struck by the beauty of this piece of mechanics.”⁶⁷

CHINESE TRIBUTE TO THE COURT

Clocks were also presented to the court by Chinese officials as part of their tribute gifts, which included items for the scholar's desk, decorative objects,

and foreign goods.⁶⁸ From Guangzhou alone there are more than ten thousand extant items in the Palace Museum, Beijing, representing only a small fraction of the total amount of tribute sent to the emperor.⁶⁹ Fortunately, many of the Qing-dynasty tribute lists, *gongdan*, and presentation lists, *jindan*, are still extant. The earliest, one of five from the Kangxi period and dated to 1722, consists entirely of imported goods (though none of them clocks) in keeping with the Kangxi emperor's interest in foreign items. From the Yongzheng and Qianlong period are more than five hundred and ten thousand lists respectively, which show foreign items forming a substantial part of all tribute to the court. Clocks are prominent among these goods.

The first clocks and watches in the imperial collections were of European origin, but the great demand for clocks encouraged the development of a native industry beyond the palace workshop. Manufacturing centers developed in other areas of China owing to two factors: the demands by ministers and high officials seeking imperial favor who chose elaborate clocks as tribute for the court, and the consumption of these items by the elite and official class. The most important of these centers in the eighteenth century was the southern Chinese city of Guangzhou, although clock making came to be practiced in Suzhou as well.⁷⁰ Such pieces could also be found in Beijing households.⁷¹ Liang Zhangju, writing in the mid-nineteenth century, mentions that both Guangzhou and Suzhou were known for making *zimingzhong*.⁷² Other, less important, centers included Shanghai, Ningpo, and Nanjing.⁷³

It is not known exactly where or when native Chinese clock making began. Undoubtedly, the craft developed imitating imported watches, and it is likely that there was some manner of industry in Guangzhou before the establishment of the imperial workshop at Beijing in the early eighteenth century. All of the Jesuits arrived at Macao and Guangzhou before making their way to other parts of the empire, and the artisan community would likely have been familiar with the products that the missionaries brought with them. Ricci mentions Cantonese “craftsmen,” though not specifically watchmakers, who assisted in clock making in the late sixteenth century.⁷⁴ As foreign trade continued through Guangzhou, its craftsmen would have been further exposed to foreign goods. Thus, by the eighteenth century, the Chinese were already able clockmakers. In 1736, Jean-Baptiste Du Halde said of Chinese craftsmen:

It is true their Invention is not so good as that of our Mechanics, but the Tools they make use of are more simple, and they can imitate exactly enough any Pattern that is brought them out of *Europe*; so that at present they are able to make Watches, Clocks, Glass, Muskets, Pistols, and several other things, of which they had no Notion, or made but very imper-

fectly: There are Mechanics of all sorts in every City, some of which work in their Shops, and others go from Street to Street to offer their Service to such as want it.⁷⁵

The technical ability of the Chinese and their apparent interest in foreign objects were mentioned in the writings of the missionaries who found themselves acting as observers and reporters of cultural matters in China for a wide European audience. Semedo said of Chinese interest in things European and of their abilities,

When they see any thing which cometh from *Europe*, although there be in it little art or ingenuity, it is by them commended with singular applause; and many times with the expression, O, say they, *These people are not like us, dull and un-ingenious*. And sometimes of manufactures made in their own Kingdom, with which by reason of the vastness thereof, they are unacquainted, they will say, that they were not made there, but brought from *Europe*. A modesty indeed worthy to be envied, and so much the more because it is seen in a people that exceed many others in their abilities, to the shame of those Nations, which have no eyes to see, but such as are infected with the disparagement of what they behold.⁷⁶

In particular, he notes, “They are not less ingenious *Mechanicks*, than the *Manufactures*, which come from thence, shew them to be, although all which some, are not made by the best Masters.” He tells of their “very excellent . . . works” in ivory, amber, ebony, gold, silver, and porcelain, and of their skills in clock making.

The workmanship of *Europe*, which they most admired, were our clocks, but now they make of them such as are set upon tables, very good ones, and will be able to do the like in small ones, if the price of them there did equall ours. Although they make some things, whose price would be excessive if we should cause them to be made here, Notwithstanding in the generall we do much exceed them in *manufactures* and mechanick Arts, except it be in that same *Charam* [?], which is indeed a singular Artifice.⁷⁷

This, however, is not the earliest mention in Western literature of the Chinese skill in making Western-type clocks. In his discussion of the events of 1582 and 1583, Nicolas Trigault wrote in 1615 not only of the Chinese skill, but of a Goan clockmaker who worked briefly at Macao. Chinese craftsmen from Guangzhou worked for this clockmaker.

As an alternate, [the Jesuits at Macao] sent the clock-maker back to the Governor at Sciauquin [Zhaoqing]. This man was from the Province of Goa in India, one of the so-called Canarii, of deep brown complexion which the Chinese admired as something unusual. When the boat returned with the artisan and the explanation of his arrival, the Governor expressed himself as pleased with his coming and also with the valuable little present, in the form of a European rarity, that was brought to him from the College at Macao. Immediately he sent for the two best craftsmen in the city, to assist the visiting jeweller in his work and the clock was made at the Mission House.⁷⁸

These accounts show evidence of isolated examples of the skill being practiced by the Chinese and are not indicative of an industry.

Guilds were an important part of the clock-making profession in a number of centers, including Guangzhou, Suzhou, and Beijing. Guilds covered almost every profession, regulated the hours and wages, and set standards for quality of work. Nearly all goods were sold through the guilds. In Beijing, for example, clocks and watches made outside of the palace workshops were made and sold by members of the clockmakers' guild.⁷⁹

Clockmakers belonged to the Zhongbiao hangshang hui (Commercial Clock Guild Association). Several institutions within this guild can be traced back to the Jesuits. Even into the early twentieth century, each apprentice was given additional instruction in the French language, and at one time, all the members had to belong to the Roman Catholic faith.⁸⁰ The guild not only regulated the buying, selling, construction, and repair of clocks and watches but was responsible for taking care of its members, even in death.

Little is known of the early years of the manufacture of clocks outside of the palace workshop, as most of the documentary evidence pertains to the nineteenth century. The most important center during the Qianlong period was Guangzhou; Suzhou did not come into prominence until the nineteenth century.

Guangzhou in the eighteenth century was the second largest city in China after Beijing, and the most populous city in south China. It had the largest port and was the main contact point for foreign trade. Guangzhou had a large community of craftsmen that produced a vast amount of high-quality goods for both domestic and overseas markets. The clockmakers in Guangzhou constructed two products: one to be used as tribute to the court, and the other for the popular market. Tribute clocks comprise the largest group of extant native-made pieces in the collection of the Palace Museum and represent some of the finest work of the Cantonese craftsmen.

In Guangzhou, as with the other centers, the clock-making industry was the direct result of the foreign presence. The artisans had the opportunity to

study at first hand fine pieces imported from Europe. In fact, the lists of tribute from Guangdong province, now preserved in the archives at Beijing, reveal that between the eighth year of the reign of Yongzheng (1730) and the fifty-ninth year of the reign of Qianlong (1794), a number of imported timepieces were presented to the Qing court. Most came from London and in some cases were assembled in Guangzhou.⁸¹

At first, the Cantonese clockmakers copied these imported clocks and watches. Gradually, however, they developed a style of their own. The clocks produced in Guangzhou for tribute purposes were of several different materials, including gilt copper, painted enamels, *basse-taille* enamels (in which a low-relief design is carved into the metal, and transparent colored enamels are then painted onto the surface to the original level of the metal), painted glass, and *zitan*, or red sandalwood, which could be quite elaborately worked.⁸² In some instances, though, the inner workings were imported, which can explain why Cantonese clocks were known for their accuracy. In one example, the movement of a musical clock in the form of a double gourd or calabash made in Guangzhou in the eighteenth century is signed “Jno. Brockbank London No. 19”; John Brockbank was an English clockmaker who was active from 1761 to 1806.⁸³

The Guangzhou makers also supplied clocks for the popular market; and these pieces were much simpler in both design and construction. Three export watercolor paintings of storefronts in Guangzhou from the end of the first quarter of the nineteenth century, now in the collection of the Peabody Essex Museum at Salem, Massachusetts, reveal that a number of establishments sold clocks and watches.⁸⁴ Two of these paintings show sellers of European items, with watches suspended from chains displayed among bottles of wine, porcelains, fabrics, and ropes. A third painting, however, is of a watchmaker’s shop and shows table clocks, watches with their chains, watch fobs, and wall clocks with gourd-shaped weights (fig. 10). Two clockmakers sit at a workbench, while two other men at the counter examine pocket watches.⁸⁵

Craftsmen in Suzhou also made clocks modeled on Western mechanics. As with the makers in Guangzhou, most of the documentary evidence that exists pertains to mid- to late-nineteenth-century makers. However, there are records of a workshop active during the Jiaqing period (1796–1820) headed by Zhang Rongji, who lived just outside the city gate. His grandfather made and repaired clocks in Suzhou, and when Zhang was twelve or thirteen years of age, he began to study the craft under the direction of his father.⁸⁶ In the late eighteenth century, this workshop had three people; by the late nineteenth century, it had opened an additional branch in Shanghai that operated until 1921.⁸⁷

The earliest written evidence for clock making in Suzhou is found on a stone stele dated to the twenty-first year of the Jiaqing period (1816) and



Fig. 10. Watchmaker. Gouache, end of the first quarter of the nineteenth century. Peabody Essex Museum, Salem, Massachusetts, E80,607.34. (Photograph by Mark Sexton.)

located just outside Suzhou at Lumuwucun. Titled “A Record of the Clockmakers’ Burial-ground,” the stele tells of the purchase of a plot of land to serve as a burial place for members of the clockmakers’ guild.⁸⁸ According to this tablet, Suzhou had a clockmakers’ guild with active members. Archival records indicate that by the late Qing dynasty, there were fifty-two clockmakers in all working among eighteen workshops, each having between two and five clockmakers.⁸⁹

Observations on Chinese clock making made by foreign residents in China offer some insights into the craft in the nineteenth century. D. J. Macgowan, an American physician in Ningpo, in a report to the United States Commissioner of Patents, supplied information on the state of the art of clock making in China in 1851 as part of his overall recommendations on the design of watches for the American China trade. By 1851, Macgowan observed that the number of imported watches had decreased owing to two factors: the reduced revenue available because of the opium trade, and the increased native production of clocks and watches. But the overall number of Chinese shops with

makers was actually small in number. He reported that in Nanjing there were forty shops; in Suzhou, thirty; in Hangzhou, seventeen; in Ningpo, seven. Together, they produced about one thousand clocks and watches per year, about two-thirds of the national annual total. Each shop employed an average of four men, who were engaged, by and large, in repairing rather than making clocks.⁹⁰ The least expensive timepiece sold for seven dollars; the most costly for one hundred dollars, with the average price being twenty-five dollars. Unfortunately, Macgowan's recommendations went largely unnoticed, and America failed to enter the clock trade to any successful degree.

THE CIRCULATION OF CLOCKS AT QIANLONG'S COURT

Two sets of palace archival records offer some information on the storage, display, manufacture, and disposal of clocks in the imperial palaces in the eighteenth century. These extant documents cover the annual activities of the Office of Clock Manufacture (*Zuozhongchu*) that operated under the administration of the Imperial Household Department (*Neiwufu*) and include only items made in the palace workshop and not any pieces, Chinese or European, that were acquired as gifts or tribute. The earliest extant record begins in the twenty-first year of Qianlong's reign (1756). Although these appear to be annual records, the set is incomplete and the documents are not available for all years. The descriptions of the clocks themselves lack detail, making it nearly impossible to identify individual pieces. However, these records do allow some conclusions to be made regarding the circulation of clocks at Qianlong's court.

The clocks made in the imperial workshop were produced either for the use of the emperor or to be dispersed as gifts at his discretion.⁹¹ The emperor's own collection was distributed over his three palaces: the Forbidden City complex in Beijing, the Summer Palace of the Yuanmingyuan, and the Bishu shanzhuang (Mountain Hamlet to Flee the Heat) at Jehol. The majority of the clocks were housed in the Forbidden City and the Yuanmingyuan, likely because the palace workshops were located at these sites and transporting the delicate pieces to Jehol, which was a considerable distance away over uneven terrain, would have been difficult.

At the Forbidden City, dozens of locations within the Inner Court held clocks.⁹² When pieces were moved from one site to another, slips of paper were attached to its description in the memorials to mark the change of location.⁹³ When not on display, these clocks were stored in an area known as the Yuanhe of the *Zuozhongchu*.⁹⁴ Smaller items, such as the finely worked watches in the collection, were kept in the emperor's miniature curio cabinets.⁹⁵ Records also indicate that particular pieces were placed on display during the time of the

New Year's festival. The Ningshougong complex, a luxurious palace compound that followed the overall plan of the Forbidden City and was designed for Qianlong to use upon his retirement, was a popular location.⁹⁶

As expected, a substantial number of elaborate clocks were also displayed in the Yuanmingyuan as they complemented the overall decorative scheme of the European-style buildings located at this site. The Yuanmingyuan was a favorite summer retreat for the Qing emperors and appears from sources of the period to have been a favored repository for Western clocks and watches, and of other examples of Western art. Here, in keeping with his interest in Western aesthetics, Qianlong ordered the construction of a series of European palaces within the grounds of the Yuanmingyuan. These *xiyanglou* (“Western ocean” palaces) were designed after Versailles by Jesuit missionaries and built in two stages between 1747 and 1759 with an addition constructed in 1768. The first stage began in the northeast corner of the Yuanmingyuan; the second stage saw the structures line the northern border of the adjoining Changchun-yuan.⁹⁷

These European palaces were not used as a residence, but rather to showcase the emperor's collections of furniture, wall hangings, telescopes, mirrors, and, of course, clocks, watches, and mechanical toys. Michel Benoît (in China 1744–74), having spent a good deal of his time at the Yuanmingyuan designing elaborate waterworks for the emperor,⁹⁸ wrote in 1773 a rather long and detailed description of the interior features of one of the palaces and the treasures contained therein. He stated that the apartment of the emperor was a large building, some ninety feet long and twenty-five feet wide, and was divided into three rooms, the innermost being the throne room.

The throne is accompanied by different expensive and tasteful ornaments most of which were made in Europe. Among the ornaments, those which impressed me most were two clocks of medium size whose supports, of gold or gilt silver, were worked in the form of branches with overlapping leaves. On top of the support of one of them, an elephant made different movements with its trunk. On the branches of the other is a dragon. The whole was made in a manner so natural that one would believe they are living animals.⁹⁹

The collection continued to grow. Several decades later, the Jesuit F. Bourgeois (1723–92), in a letter dated 1786 at Beijing, describes the articles of European manufacture at the Yuanmingyuan:

The European palaces contain only European ornaments and furniture. It is unbelievable how rich this sovereign is in curiosities and magnificent objects of all kinds from the occident. You ask me if the

Emperor has any Venetian and French glass. Thirty years ago he already had so many pieces that, not knowing where to put them, he had a quantity of the first grade broken up to make window panes for his European buildings.

In the hall which he had made new for the tapestries of the manufacture of Gobelins,¹⁰⁰ which the French court sent in 1767, there are many pier glasses. You see, this hall, 70 feet long and of good width proportionally, is so full of machines that one can hardly move about in it. Some of these machines have cost two or three hundred thousand francs, for the work on them is exquisite and they are enriched with innumerable precious stones.¹⁰¹

This hall, known as the Yuanyingguan (Observatory of the Distant Waters), was built specifically to house the tapestries, as there was no other building suitable for displaying them up until this time. Construction on the hall probably began as early as 1768.¹⁰²

Lord Macartney, during his embassy to China on behalf of the king of England, also saw the great hall of the emperor at the Yuanmingyuan in 1793. The room was 150 feet in length and 60 feet in width.

At one end I observed a musical clock that played twelve old tunes, the “Black Joke,” “Lillibullero,” and other airs of the “Beggars’ Opera.” It was decorated in a wretched old taste, with ornaments of crystal and coloured stones but had been, I dare say, very much admired in its time. On the dial appeared in large characters, “George Clarke,¹⁰³ Clock and Watch Maker, in Leadenhall Street, London.”¹⁰⁴

Macartney here is commenting on an English-made clock, but there were countless Chinese-made clocks at the Yuanmingyuan displayed in the various buildings there.

The palace at Jehol is mentioned much less frequently in the palace documents as a repository for clocks. While little is known about the collection at this imperial residence, Macartney, who was formally received there by the emperor on September 17, 1793, noted that the total value of the toys, jewelry, musical automata, instruments, clocks, and watches kept there was estimated at two million pounds sterling.¹⁰⁵ Macartney had remarked that the forty or fifty palace buildings he visited were “all furnished in the richest manner . . . with every kind of European toys and sing-songs; with spheres, orreries, clocks, and musical automatons of such exquisite workmanship, and in such profusion, that our presents must shrink from the comparison and ‘hide their diminished heads.’” And yet,” Macartney continues, “I am told that the fine things we have seen are far exceeded by others of the same kind in the apart-

ments of the ladies and in the European repository at Yuan-ming Yuan.”¹⁰⁶ Members of the later Dutch embassy under Isaac Titsingh also remarked on the vast imperial collections. André Everard van-Braam Houckgeest, the former chief of directors of the Dutch East India Company and second in charge of the embassy behind Titsingh, in early 1795 told of numerous curiosities and many European clocks, part of a collection of magnificent objects.¹⁰⁷ In the thirty-seventh year of Qianlong’s reign (1772), nineteen clocks were sent directly from the workshop to various locations at Jehol.¹⁰⁸ Then, in 1774, twenty-four clocks on display at the palace at Beijing were reassigned there.¹⁰⁹

In addition to his personal collection, the emperor also kept a large number of clocks to be given as gifts, often to members of the imperial family or officials.¹¹⁰ These were listed as to be “used as rewards” (*shangyong*), or “for general use” (*gongyong*). Among the recipients were the empress, the imperial concubines, the “elder brothers” (*a’ge*) of the emperor, members of the court, and various other individuals.¹¹¹ The quality varied considerably. Some of these clocks, however, were not presented but instead were transferred to the storage area or placed on display. These tended to be clocks designated as being of the finest quality, *toudeng*. Occasionally clocks were sent back to the enamelers to have embellishments such as tiny plum blossoms added to the piece.¹¹²

THE FATE OF THE COLLECTION

What was the fate of this magnificent imperial collection of clocks? It was greatly diminished by the sack of the Yuanmingyuan in 1860, the Boxer Uprising in 1900, and political upheaval in the early part of this century, when many clocks were either destroyed or taken out of China. Today, only a fraction of the original collection still resides in the palace in Beijing, and many are in various public and private collections in Japan, Europe, and North America. Some watches and other small timepieces may be found in the National Palace Museum, Taipei.

On October 7, 1860, Anglo-French troops under the commands of Sir James Hope Grant and General Cousin de Montauban began their attack on the Yuanmingyuan, the emperor’s Summer Palace, “the glory and boast of the Chinese empire,”¹¹³ and looted its treasures. Because so many of the emperor’s elaborate clocks were housed at the Yuanmingyuan, this incident was particularly devastating to the collection. Justified as a “solemn act of retribution,”¹¹⁴ the ransacking resulted in the destruction of the palace complex as well as the looting—and breakage—of the imperial treasures. The ensuing confusion of the British and French troops greedily grabbing what they could before local Chinese arrived created a scene that was described by one observer as similar

to the sack of Rome by the barbarians.¹¹⁵ Many of the imperial treasures, including “jewelled music boxes, alarm clocks and mechanical toys . . . [were] carried in armfuls from the buildings, tipped into wagons or piled in broken pieces on the paths.”¹¹⁶ One of the more striking, though less credible, “eye-witness” accounts comes from the Comte d’Hérison, de Montauban’s secretary, who was not actually stationed at the Yuanmingyuan on that day.¹¹⁷ As a “curious spectator,” he observed the strange sight of all manner of humanity scrambling for treasures. It was like a crushed anthill with the soldiers and others scurrying about carrying “a grain, a larva, an egg, a piece of straw between their jaws.”¹¹⁸

One of the French officers, J. L. de Negroni, a “capitaine d’émissionnaire,” was present at the looting and recalled the treasures to be had.

Yesterday I went to visit the pretty pavilion; what beautiful things I found there!—a ravishing jewelry box of white jade encrusted with rubies, coral, and lapis lazuli, containing bracelets, manicure sets, hairpins, a marvelous necklace of pink rubies! then so many other charming and precious objects. . . .

Stunned, entranced by so many splendors! I was like Aladin, amazed in his enchanted palace paved with gold and diamonds.¹¹⁹

While many objects were greedily grabbed by the troops, others were destroyed during the looting. Comte d’Hérison tells of the fate of a jewel-encrusted clock in the palace: “Sadly, there was one [soldier] who smashed a Louis XV clock in order to have the face where the hours were marked crystal numbers that he took to be diamonds.”¹²⁰ The spoils were put up for general auction by order of Hope Grant with the proceeds of twenty-six thousand pounds to be divided among the British officers and the noncommissioned men.¹²¹ The auction was likely held at the Tibetan Buddhist Western Yellow Temple (Xihuangsi) in Beijing.

By early 1861, treasures from the Yuanmingyuan could be found in Europe either offered for sale or placed on display. In 1861 and 1862, the London auction house of Christie, Manson and Woods featured items labeled as coming from the Summer Palace.¹²² Many other objects taken by the soldiers appeared on the European auction market: in December 1861, a “precious collection” of articles from the Yuanmingyuan were sold in Paris.¹²³ In more recent times, other items from the Yuanmingyuan have appeared on the auction market. In October 1987, the head of a monkey and a boar, two of the twelve bronze animals designed by Castiglione for Benoit’s elaborate fountain, were auctioned by Sotheby’s, New York.¹²⁴

The earliest public display of Yuanmingyuan items appears to be an exhibition at the Tuileries in April 1861 (fig. 11). These items were presented to

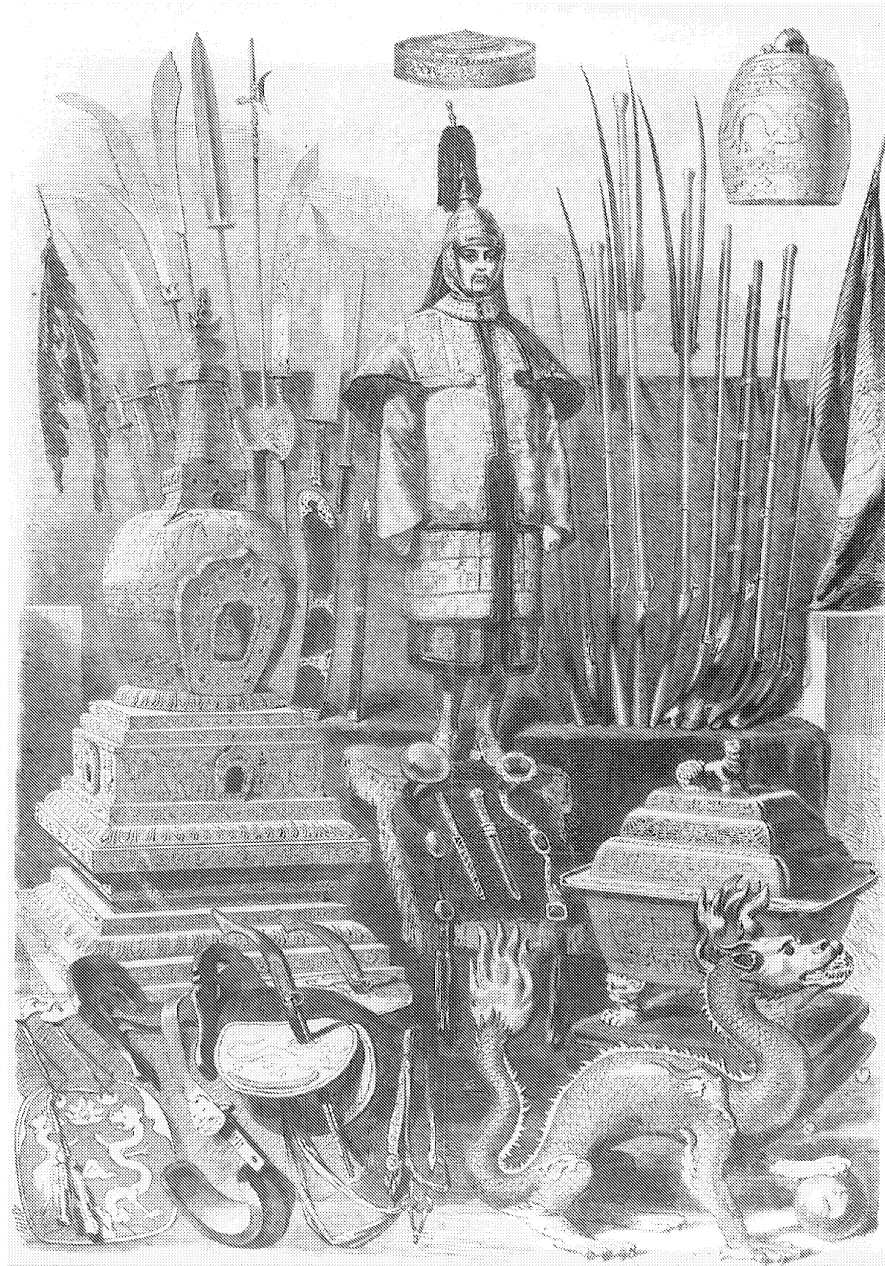


Fig. 11. “French Spoils for China Recently Exhibited at the Palace of the Tuileries.” *Illustrated London News*, April 13, 1861, 334.

Napoleon III by the French soldiers and included military items such as swords, saddles, and “the Chinese emperor’s war costume,” as well as a model of a pagoda, a bronze bell, and two *ruyi*, or scepters.¹²⁵ However, in London, the situation was different, as few items made their way into the possession of the British Crown. Because of the Beijing and London auctions, most items were instead dispersed into a number of private hands. When the “great

attraction” was held at the 1862 International Exposition, which featured the “spoils from Peking,”¹²⁶ the exhibition organizers solicited assistance from British consuls in China and were able to display a few items said to be from the Summer Palace, including a “skull of Confucius mounted as a drinking cup.”¹²⁷

In 1865, an exhibition was held at the Crystal Palace and featured the collection of Negroni, who accumulated a large number of objects at the sacking. He spared no expense in acquiring these objects, and because he found them to be “in a number of different hands,” he was obliged to purchase many from the soldiers, at great cost. The *Illustrated London News* reported on this “interesting collection . . . brought from the Emperor of China’s Summer Palace.” Most noteworthy among the items (and, in fact, prominently placed in the foreground of the accompanying illustration, figure 12) were the two clocks that were given lengthy descriptions in the article.

The stands of these timepieces are furnished with machinery by which the small figures of birds displayed in their upper compartments are made to move and to chirp or sing. In one case, . . . there are two of these little birds displayed in a cage of golden filigree, which is ornamented with fine pearls and enamels. The mechanism beneath is extremely complicated, and produces a great variety of movements in the wings, tails, beaks, and eyes of the little birds, with tones very like a bird’s natural notes. The other timepiece, or rather clock-stand, is so placed that the bird which it contains does not appear in our Illustration; the compartment which holds the bird, perched on a golden spray or twig, is open only behind, while the front of the clock-stand, which had the general form of a flagon or large vase closed with a stopper, displays the clock dial and the escapement above it, set with diamonds, rubies, sapphires, emeralds, and turquoises. The stopper serves for a key to wind up the mechanism.¹²⁸

Negroni had already exhibited his collection in Paris in the previous year. The catalog, *Souvenirs de la Campagne de Chine*, lists these items in its twelve chapters and includes porcelains, lacquers, ivories, furs, embroidered silks and tapestries, paintings, cloisonné, and “native jewels and those of Europe,” which he says are the most important part of his museum.¹²⁹ Within this group are clockwork pieces, including a small cage containing a singing bird that also moves its eyes and beak; a flask-shaped clock with diamonds; a music box, and a collection of watches of “unimaginable beauty,” all embellished with diamonds, rubies, emeralds, and enameled portraits or flowers.¹³⁰

With the act of plunder and the subsequent expatriation of the spoils of war to Europe, the objects from the Yuanmingyuan came to represent the



Fig. 12. “The Chinese Exhibition at the Crystal Palace.” *Illustrated London News*, May 6, 1865, 423.

conquest of China. They were no longer simply “loot,” but served as tangible evidence of the strength and superiority of the Anglo-French forces over the Chinese. Once in Europe, these objects were auctioned off and put up for public display. While most of the objects were seen as exotic and curious, of particular importance were the items directly associated with the emperor: his robes, his seal, his throne. These became “emblems of humiliation”; they were, as Hevia writes, symbols of “Qing sovereignty that were now the possessions of Queen Victoria and Napoleon III [and] signified that the haughty monarch of China had been brought low and punished for his excessive aloofness.”¹³¹ The European clocks stood apart from both the items associated with the emperor’s person and the Chinese goods in the palace. At one time gifts to the emperor from the British king, these clocks were reclaimed as though the property of the king was being returned to his heir. For Negroni, whose collecting was motivated by patriotism, the spoils from the Yuanmingyuan were designed to enrich his homeland and “add to the grandeur of France.”¹³² They

were eventually set up in the Chinese Museum at Fontainebleau by Empress Eugénie.¹³³

While the palaces and their contents at the Yuanmingyuan were either pillaged or destroyed, the objects in the Forbidden City suffered a different fate, as the collection remained largely intact until the late nineteenth century. In 1882, there were more than thirty-four hundred clocks that were products of the imperial workshop in the various halls and palaces of the Forbidden City.¹³⁴ However, when the Republic of China was established under Sun Yat-sen (1866–1925) in 1912, some of the art objects were sold by the Manchu princes.¹³⁵ The Palace Museum within the grounds of the Forbidden City was not established until 1925.

Beginning in 1932, the collection faced its greatest challenge. In 1931, Japan invaded Manchuria; it would not be long until armies advanced into north China. To ensure the safety of the treasures, the authorities at the Palace Museum in the Forbidden City prepared to evacuate the finest pieces from the collection to a safer location. In early 1933, nearly twenty thousand crates containing porcelains, bronzes, paintings, rare books, and elaborate clockwork began their long journey, which would eventually cover five thousand miles over a period of sixteen years. The crates were transported to Shanghai and stored for four years. Then, in late 1936, the objects were moved to Nanjing. The Japanese captured Beijing in July 1937, and the conflict soon engulfed Shanghai and Nanjing. The crates were then moved inland to Chongqing, Sichuan. The collection was housed in a number of temporary locations including schoolhouses and abandoned warehouses where termites posed a constant threat. The collection was never far from disaster.¹³⁶ Two years after the end of the Sino-Japanese War in 1945, the objects were sent back to Nanjing; however, the Communist threat forced the Nationalists to retreat to Taiwan in 1948, taking four thousand crates of artifacts with them. This would become the core of the collection of the National Palace Museum, Taipei.¹³⁷

The clocks were not moved to Taiwan but instead were returned, along with the other items, to Beijing. At present there are approximately one thousand clocks and watches remaining from Qianlong’s collection in the Palace Museum.¹³⁸

NONIMPERIAL COLLECTIONS AT THE COURT

But the emperors were not the only collectors of luxury items at the court. The most famous was Grand Councillor Heshen (1750–99), who held office under the Qianlong emperor and who was known for his vast accumulation of wealth and enormous power. Heshen was Qianlong’s favorite minister and was characterized as an avaricious opportunist who used his court connec-

tions for personal gain. It has been said that his wealth rivaled that of the emperor himself and that his fortune was valued at about ten times the 70 million taels in annual income of China as a whole at that time.¹³⁹

Heshen was the grandson of a high-ranking Manchu grand secretary under Qianlong and began his career as a low-level official. However, in 1775 at the age of twenty-five, he was promoted to the position of a Manchu guards officer of the inner palace and thus had contact with the Qianlong emperor, who was then sixty-five years old. Heshen quickly became the emperor's favorite and in the next year had a swift rise through a series of promotions unequalled in Qing history. When Qianlong abdicated in 1796 in favor of his son, the Jiaqing emperor, Heshen continued his dominance. It was not until the death of Qianlong in 1799 that Heshen's power base eroded. Five days later, he was imprisoned by Jiaqing, and less than three weeks after the emperor's death, Heshen was forced to commit suicide by hanging.¹⁴⁰

As a member of the Grand Council since 1776 and as grand councillor since 1797, Heshen was in a very powerful and influential position. He was said to have had a quick and forceful intelligence and a high level of literacy. He was also able to make an astonishing amount of money through his abuse of power. His many improprieties included charging service fees, taking bribes, misusing funds, and appropriating objects from the imperial collection. On one occasion Heshen reportedly took particular liking to a snuff bottle made of a single large pearl that was presented to the emperor. A few days later, the bottle was in Heshen's possession. He simply took whatever he liked from the imperial apartments.¹⁴¹

Heshen's main residence could rival that of the emperor, and the treasures housed within were without rival. But it was only after Heshen was imprisoned and tortured under Jiaqing that his full wealth was disclosed. Under cross-examination, Heshen told of a fantastic accumulation of wealth that included sixty million taels of silver and twenty-seven thousand taels of gold. However, the bulk of his property, as he eventually revealed, was buried in the garden of one of his residences.¹⁴² The items were confiscated and inventoried under 109 schedules. Twenty-six of the schedules contain detailed lists; the value of these alone is nearly 224 million taels with the total value of the goods estimated to be around 800 million taels.¹⁴³ It is estimated that Heshen's estate would have been enough to pay off the entire indemnity from the Boxer Rebellion of 1900 four times over.¹⁴⁴ Among the items in the long list of possessions were 9,000 gold *ruyi* scepters, each weighing forty-eight ounces; 771 early inkstones; 288 large rubies; 4,070 sapphires; 28,000 pieces of jewelry; 2,390 snuff bottles (making this one of the most important collections in history); a gold dinner service consisting of 4,288 pieces; 38 European clocks inlaid with precious stones, and 140 gold and enamel watches.¹⁴⁵

It is unclear what happened to Heshen's incredible wealth. Confiscated

by the Jiaqing emperor, the items were likely distributed among his own ministers and officials. It is possible that some pieces may have been integrated into the imperial collection, but there is no evidence to verify this.

INTEREST IN CLOCKS OUTSIDE THE CHINESE COURT

Beyond the imperial palace, clockwork had attracted the attention of the Chinese elite, beginning with the European clocks given to a Chinese official by Michele Ruggieri, followed by Ricci's gift of an elaborate watch to the governor-general of the provinces of Guangdong and Guangxi in December 1582. The development of the technology in such cities as Guangzhou and Suzhou increased the number of clocks available, and while many pieces were produced for court consumption, others of simpler designs were made for the popular market.

An economic expansion that had begun in the Song dynasty intensified, creating increased opportunities for wealth that resulted in demographic increases and changes in social differentiation and mobility.¹⁴⁶ This was particularly true in the eighteenth century, when urbanization and commercialization led to interregional trade and a growth in the overall population. The rising upwardly mobile merchant and landlord class redefined the elite, which previously had consisted of the literati alone. Owing to the increased purchasing power of these nouveaux riches, the outward trappings of elite status were now made available to them. This allowed the merchant class that dominated urban culture, for example, to imitate aspects of an elite lifestyle without having the distinction of being a scholar or having a career as a high-ranking official.

By the eighteenth century, perhaps because of their exclusiveness or association with the emperor, clocks, no matter how simple, seemed to have become an attribute of the elite. While paintings of the traditional theme of the scholar surrounded by works of art do not show clocks among the desired collectibles of the literati, depictions of interior life from painting and literature represent clocks occupying a prominent place within the home's more public spaces. An eighteenth-century painting by an unknown artist shows a family of six walking through a reception hall as if on their way outdoors (fig. 13). In keeping with Chinese tradition, this room is classically decorated with a few pieces of furniture, most notably a long table placed against the wall, in front of which are two hoop-backed chairs. Above the table is the most important object in the room: a hanging scroll flanked on either side by a calligraphic couplet. In order not to distract the eye from the painting, the table was left uncluttered; among these few select items is a Western-style table clock.



Fig. 13. Painting of a Chinese interior, unknown artist, eighteenth century. Formerly in the collection of the Compagnie de la Chine et des Indes, Paris. (Michel Beurdeley, *The Chinese Collector through the Centuries* [Rutland, Vt.: Charles E. Tuttle, 1966], fig. 79).

The popularity and use of Western clocks and watches during this period may also be seen in contemporary fiction, such as the novel *Honglou meng* (*The Dream of the Red Chamber*, also known as *Shitou ji*, or *The Story of the Stone*). Considered to be China's greatest novel, *The Dream of the Red Chamber* was first published in 1792, nearly thirty years after the death of its author, Cao Xueqin (1715–63), and probably some fifty years after it was begun.¹⁴⁷ In its 120 chapters, the novel offers vivid and detailed descriptions of mid-eighteenth-century life through the tales of the wealthy Jia family. It has often been considered to offer a literary parallel to Qianlong's court, a

“mine of information on almost every aspect of traditional Chinese culture and social institutions.”¹⁴⁸

Honglou meng is a valuable source of information on the kinds of objects used within an aristocratic Beijing home in the eighteenth century. Throughout the novel, Western-style clocks are mentioned, and through its pages we can determine the different types of clocks consumed by the elite, how they were used, and how they were regarded.¹⁴⁹ But clocks also signify the status of the master of the household and further delineate the differences between the urban upper class and the rural nonelite in late imperial China.

The type of clock referred to most often is a wall clock that sounds the hours. At several points in the novel, the main characters hear the chiming of the clock. In one instance, the “chiming clock that hung on the partition in the outer room struck twice,” signaling the time for sleep; later the chiming clock strikes four, indicating the passage of time for the sleepless Jia Baoyu, who lies awake through the night.¹⁵⁰ These time periods in the original text of the *Honglou meng* are reported using the Chinese double-hour system. Contemporary with the novel were clocks made in Suzhou that told the time following Chinese convention but were European in appearance.¹⁵¹

The clocks in *Honglou meng* also reinforce the status of the Jia family. A more unusual and elaborate example of a wall clock gives an indication of the wealth of the owner. This particular piece is more than three feet in height and contains an automaton in the form of a little boy who indicates the time with a pointer. The hours are signaled by the sounds of a little mechanical orchestra.¹⁵²

Clocks are used to highlight the differences in class between the urban dwellers of the house and rural folk as well. The elderly Grannie Liu, on first arriving at the mansion from the countryside, is “dazzled by the bright and glittering things that filled the [reception] room,” so that she is “speechless with wonder.”¹⁵³ While waiting in a room just off the main reception hall for one of the mistresses of the house, Wang Xifeng, Grannie Liu is given a surprising introduction to a chiming wall clock. First “distracted by a persistent tock tock tock tock not unlike the sound made by a flour-bolting machine, . . . she could not forebear glancing round her from time to time to see where it came from.” In time, Grannie Liu notices a “boxlike object fastened to one of the central pillars of the room, and a thing like the weight of a steelyard hanging down from it, which swung to and fro in ceaseless motion and appeared to be the source of the noise which distracted her.” Having never seen such a thing before, she wonders what it is; as she moves closer to the box to examine it, “it suddenly gave forth a loud dong! like the sound of a bronze bell or a copper chime, which so startled the old lady that her eyes nearly popped out of her head.”¹⁵⁴ This was followed in quick succession by eight or nine other strikes. This clock startles Grannie Liu: for her, it is an unknown and somewhat frightening object of curiosity that has no obvious meaning or purpose. For the

maids of the house, on the other hand, this clock is a signal to scurry about in preparation for Wang Xifeng's arrival. What is commonplace in this household is not so familiar outside this wealthy urban setting.

Later in the novel, Wang Xifeng, as manageress of the household at the Ningguo mansion, relies on a clock to regulate not only her day but to impose some order on the servants as well. Her higher status is signified by the ownership of a pocket watch; the others are expected to keep track of time by looking at a centrally placed clock. She tells them,

Those who are used to working with me at the other place always have a watch handy, and everything they do, no matter how big a thing is, is done at a fixed time. You may not have watches, but at least there is a clock in your master's drawing room you can look at. So here are the main times to remember. At half past six I shall come over to hear the roll-call. At ten o'clock I take my lunch. I shall see people with reports to make or tallies to collect up to, but not after eleven o'clock. At seven in the evening, as soon as the paper offerings have been burnt, I shall make a personal tour of inspection; and when I get back from it, I shall issue those on night duty with their keys. Then the next day I shall be back here again at half past six.¹⁵⁵

Depending on the status and wealth of the household, watches could be found among the servants as well. Zhao Yi, a clerk of the Grand Council in the eighteenth century, told of the councillor Fuheng (d. 1770) who encouraged the use of timepieces in his home. “Minister Fuheng's house,” he wrote, “is one that has clocks, to the extent that among his servants there is not even one who does not hang a watch on his body. They can verify [the time] with each other and should never make a mistake.”¹⁵⁶ Zhao Yi reports that officials also wore watches but adds this caveat:

Clocks and watches have to repaired often. Otherwise the golden thread [spring] inside will break, or they will go too fast or too slow, and then you are not able to have the correct time. Thus, among the court officials, there are those who own these things, but they still forget meetings; or, those at court who do not miss meetings and do not own clocks.¹⁵⁷

Such timepieces could be suspended from the waist or the neck on a chain or knotted cord and formed a part of personal adornment. A nineteenth-century painting in the Palace Museum, Beijing, shows a man “in ordinary dress” with a small purse and a watch suspended from his waist.¹⁵⁸ One such watch, which would have been attached to a belt, is now in the collection of the Department of Western Art and Culture of the Royal Ontario Museum (fig. 14).¹⁵⁹



Fig. 14. Watch with Chinese knotted cord. English, eighteenth–nineteenth century. Department of Western Art and Culture, Royal Ontario Museum 928.29.280. (Author’s photograph, reproduced courtesy of the Royal Ontario Museum.)

Some of these watches were of European manufacture and were quite exquisite in their design and materials. These were usually gifts to the official from the emperor as a reward for good service or from Western embassies. Clarke Abel (1780–1826), a member of the Amherst embassy of 1816–17, observed,

The Mandarins were rather gorgeously dressed, although their external garment was plain. . . . Beneath this and disclosed by its movements, appeared a silk petticoat, beautifully interwoven with gold and silk, in the forms of dragons and flowers. . . . Fans, pipes, and chop-sticks, hung by their sides; and English watches, in embossed cases, were suspended from many of their girdles. These were highly prized by their wearers, who anxiously enquired our opinion of their value. . . .

As a footnote to this passage, Abel adds that wherever the group traveled, members of the embassy were asked to give up their watches, which were “considered as objects of greatest curiosity.” He was not able to determine whether the clocks were valued as timepieces or as “baubles.” However, he concludes, “There can be no doubt, as far as the experience of the members of Lord Amherst’s Embassy goes, that watches are the most acceptable presents, on a small scale, that can be offered to the Chinese of all ranks.”¹⁶⁰

Clocks and watches continued to be appropriate gifts into the late nineteenth century. It was reported that the empress dowager Cixi (Yehe Nala, 1835–1908) was given a pin-on watch made of gold and studded with pearls, from her cousin, Ronglu, to whom she had once been betrothed. They continued to have a close friendship. Gossip held that whenever the empress dowager wished Ronglu’s company in the evening, she conveyed her message simply by touching the watch.¹⁶¹ Sometime in the twentieth century, however, the giving of watches as gifts developed an undesirable connotation. The phrase *songzhong*, “to give a clock,” is a homonym for *songzhong*, “to accompany one to one’s grave.”¹⁶²

Clocks appeared as other forms of costume accessory as well. Watches could also form part of a decorative belt buckle,¹⁶³ or were set in the tops of delicately painted enameled snuff bottles.¹⁶⁴ Some costumes even had enameled buttons in the form of tiny Western-style clockfaces.¹⁶⁵ In the nineteenth century, it was reported that Chinese men often carried two watches, “which they are anxious should always harmonize.”¹⁶⁶ Watches were usually sent in pairs by the European makers.¹⁶⁷

Like the timepieces in the novel *Honglou meng*, clocks in late-eighteenth-century Chinese society served many functions. While they could be used to announce the time, the principal value of these clocks and watches lay in their external appearance and symbolic meanings; as timepieces, they were of little practical use in regulating the day. The three young imperial princes who came to admire the “workmanship and appearance” of the European clocks brought by the Macartney embassy “candidly owned that they did not comprehend the purposes of them.”¹⁶⁸ The true function of these objects was as signifiers of social standing for the officials and wealthy elite. They were an attribute of the elite, and their very presence suggested privilege of ownership and defined clearly the lines between the upper and lower classes.

The popularity that clocks and watches enjoyed at the courts of the Kangxi and Qianlong emperors is due in part to the overall curiosity that these emperors had for Western arts and sciences. Clocks, however, held a special place within the imperial world of things. But why was their such interest in these particular items on the part of the Qing emperors? In China, clocks and watches were immensely popular with members of the court. As objects that

were introduced by foreign missionaries and given either as gifts to ranking dignitaries in return for certain privileges, or as tribute to the Chinese court in order to gain imperial patronage, these uncommon and expensive presents were representative of certain social classes and were a show of power. Certainly, when the Jesuits arrived in the late sixteenth century with their “self-ringing bells,” the Chinese were not interested in knowing the time beyond the capabilities of their own timekeepers. It obviously was not that the Western clocks provided a somewhat more accurate means of time-telling that appealed to the Chinese; it was, instead, the newness, exoticism, expense, and relative rarity of these elaborate clocks that fueled the demand for them. But why did *zimingzhong* become objects of such value when other expensive and decorative European things did not?

Value is not inherent in goods but is bestowed upon them and is subjective.¹⁶⁹ Factors including desire and demand contribute to economic value, and these are relative to the specific sociocultural situations of a particular time. In terms of value, luxury goods, which include elaborate clockwork, are not different from what are termed “necessities,” but their main use is social rather than practical. They are essentially symbolic in addition to any utilitarian uses they may have and are desired (or valued) for what they symbolize. Thus, Qianlong chose to collect thousands of elaborate clocks, and while he enjoyed them for their uniqueness in terms of both technology and design, their true appeal for him lay in their symbolic meaning. They represented the “West” and the Chinese court’s interest in Western “things”; but above all, in eighteenth-century China, Western-style elaborate clocks signified imperial power and wealth.

Much of the value of elaborate clocks was a result of their “foreignness” and novelty. They arrived from abroad and were unlike anything the Chinese had seen. They were unusual, exotic, and amusing; they were bright and colorful; they sounded the hours on their own, often to an accompaniment of accessory functions such as twirling glass-paste flowers and miniature animated beasts; and they were made of costly materials. The Kangxi and Qianlong emperors were fascinated with them. Their foreign appearance alone, however, would not have been enough to maintain their high status with the Chinese emperors. Ellen Uitzinger, in her analysis of the Western-style buildings used in the birthday celebrations at Qianlong’s court, argues that the imperial “vogue for the exotic” was in decline by 1790; by that time, the term *xiyang* (“Western ocean,” describing things of European flavor) had lost its former meaning and came to refer to odd cross-cultural hybrids with a non-harmonious blending of European and Chinese styles. Like the Western-style palaces that graced the grounds of Yuanmingyuan beginning in 1752 and which had begun to fall into disrepair at the end of Qianlong’s reign, the glory of *xiyang* aesthetics was also short-lived.¹⁷⁰ Clocks and watches did not experi-

ence such decline; clearly they were different. But what set clocks apart from the other exotic and unusual European products?

Unlike other examples of Western art, European mechanical clockwork represented a technology that had no known precedent in China and therefore could not be imitated easily. It was not a simple matter to produce clocks because of the special skills and materials that were required, and this knowledge was limited. Formal instruction in clock making by Europeans trained in this area was found only at the court, where Jesuit missionaries worked alongside Chinese artisans in the imperial workshop. Other centers of production developed, but this again was restricted to the few areas where imported clocks were available to be copied. With nearly all European pieces coming to China either already destined for the court or to be purchased in China as gifts from those who sought imperial favor, imported clocks could hardly be consumed by anyone outside of the court circle. Furthermore, even when native Chinese production was well established in the eighteenth century, the availability of these clocks was still restricted. The best pieces were presented as tribute, and simpler, plainer watches and table clocks were made for the nonimperial market. In addition, the best craftsmen were brought to the capital to assist the Jesuit missionaries in order to produce fine pieces for the use of the emperor. Thus, this limited clock production ensured that many of the available clocks found their way, in one manner or another, into the emperor's own hands.

While it is true that the Qianlong emperor had an overall interest in Western technology and the arts, his collection of clocks stood apart from other Western objects such as paintings, tapestries, and even globes, for their technology made them unique and difficult to imitate. In addition, this technology was wrapped in amusing and richly decorated packages that made these clocks highly collectible. By amassing thousands of examples of this new and unusual technology and limiting their consumption outside the court, Qianlong was using exclusivity of goods to display his power and signify his control, status, and privilege.

“An Asiatick Temple”

Western Clockwork and the China Trade

So when great Cox, at his mechanic call,
Bids orient pearls from golden dragons fall,
Each little dragonet, with brazen grin,
Gapes for the precious prize, and gulps it in.
Yet, when we peep behind the scene,
One master-wheel directs the whole machine:
The self-same pearls, in nice gradation, all
Around one common centre rise and fall.

—William Mason, *An Epistle to Dr. Shebbeare*

A great number of clocks and automata came to China from Europe in the eighteenth century, not only as ambassadorial gifts but also increasingly as commercial goods. Such items were imported as early as the seventeenth century, but it was not until the Qianlong period (1736–96) that this trade gained any importance. Although makers from a number of European countries participated, the most important centers were London, Geneva, Neuchâtel, and the Swiss Jura.¹ This chapter concentrates on two prominent eighteenth-century makers who participated in the China trade from these centers: James Cox (d. ca. 1791) of London; and the firm of Jaquet-Droz et Leschot, originally of La Chaux-de-Fonds in the Swiss Jura. This chapter traces the histories of these makers' involvement in the China trade and their strategies in dealing with this foreign market by examining the relationships between these producers and their consumers by considering the following: Whom did these makers see as their main clientele? Did they make any modifications in their products to please them? How did they reach their market? Did they give their pieces any special meanings in order to sell their clocks and watches? Examination of these questions reveals that while both the British and Swiss were

selling clockwork to the Chinese, there was little similarity in their methods. Their differing approaches ultimately resulted in different degrees of success.

JAMES COX

The clock and watch industry of the late seventeenth century was dominated by the British. Other countries were as innovative and had makers who were as talented, but the great demand in England for timepieces forced the industry there to develop more quickly. A number of social and economic factors contributed to this growth, including a large middle-class population that was required to know the time in an industrial society, an extensive transportation system that relied on accurate timing, and a relatively higher wage in England that allowed more people to purchase watches.²

English makers entered the China trade in the late seventeenth century and by the eighteenth century had taken control of the market. One of the most prolific and certainly the best documented of these makers was James Cox.³ A goldsmith and a maker of a "great variety of curious work,"⁴ he designed clocks and other novelties that were then made for him in the shops of London and Geneva. One of Cox's most famous creations is his silver swan, a life-sized bird that preened itself and "caught" fish from its glass pond.⁵ The piece is now in the collection of the Bowes Museum, Barnard Castle, County Durham, England.⁶ Cox himself described it as a "piece . . . so astonishingly executed, that many illustrious personages who have seen it, even in its unfinish'd state, have pronounc'd it rather the creation of absolute magic, than the production of human mechanism."⁷ He was also the first clockmaker to test the idea of using changing barometric pressure to power a perpetual motion clock around 1760. The fluctuating levels of a column of mercury were converted to rotary power, which in turn wound a small weight.⁸ Cox mentions this piece in his catalog of 1774. Called "The Perpetual Motion," the timepiece brought together "mechanic and philosophic principles," producing a clock that will "continue for ever."⁹ Now in the collection of the Victoria and Albert Museum, this clock at one time contained 150 pounds of quicksilver.¹⁰ Less known is Cox's short ownership, only five months in duration, of the Chelsea porcelain works, which he purchased from Nicholas Sprimont in 1769.¹¹

The earliest evidence of Cox's activities dates to 1749, when he was established at Racquet Court.¹² In addition to his shop at No. 103, Shoe Lane,¹³ Fleet Street, in London, which was in business from 1757 to 1795,¹⁴ Cox operated his Spring Gardens Museum at Charing Cross between 1772 and 1774. Here he exhibited many of his most prized mechanical wonders in an effort to increase public exposure and, by extension, the demand for his pieces. These elaborate and costly automaton clocks showcased his skill. In his

museum, “Magnificence, Taste, Utility, [and] Delight offer objects which it would be the masterpiece of Art to unite in one and the same Exhibition.” His creations “offer surely ideas *usefull* and *philosophical* enough to defend them from the reproach of being only glittering gewgaws.”¹⁵ Cox also acted as a merchant, selling items made by such well-known Swiss watchmakers as Pierre and Henri-Louis Jaquet-Droz and Jean Frédéric Leschot. He also worked foreign markets, including those of India and Russia.¹⁶ His work is well recorded: Chinese and Western collections hold many of his pieces, and his five surviving descriptive catalogs and one short “account,” which cover his activities from 1769 to 1774, describe many others.¹⁷ These spare no detail in the description of ornamentation and animation.

Unfortunately, the museum at Spring Gardens was not a financial success. In 1773, Cox obtained permission by an act of Parliament to hold a lottery of the clocks, publishing a catalog of the pieces that were to be sold. Cox declared that, owing to the “uncommon and expensive workmanship,” the employment of “numbers of ingenious artists and workmen,” and the “great scarcity of money in the East Indies,” he was forced to liquidate his collection of pieces, “many of [which] have for several years past been dispos’d of in foreign countries, much to the honour and advantage of this kingdom.”¹⁸ There were fifty-six entries in this catalog, only thirteen of which had been previously published. Among the items in the lottery were the silver swan and Cox’s perpetual motion clock.

The lottery, held in May of the following year, was set to raise £197,500. Altogether 120,000 tickets were sold for the fifty-six items. As a result, these pieces, many of them destined originally for China, remained in Europe.¹⁹ Thomas Weeks (also spelled Weekes) acquired a number of Cox’s works in the lottery, including the silver swan, and sometime after 1800, opened his “Weeks’s Mechanical Museum.” It seems that among the pieces under Weeks’s care, only the swan was preserved in good condition, as many were badly damaged through neglect or were lost. Other pieces, owing to the lack of interest in the collection on the part of Weeks’s son Charles, were later sold and eventually found their way to China.²⁰

Cox had entered the China trade as early as 1766, when he constructed a pair of elaborate clockwork automata commissioned by the East India Company as a gift for the Qianlong emperor. Over the next decade and a half, he sent numerous pieces to China via other agents. Later, at the encouragement of his son, John Henry, a branch of the business was established in Guangzhou in the early 1780s. The demand for European clocks and watches had existed in China from the end of the seventeenth century; by the eighteenth century, the British dominated the trade, making tens of thousands of pieces for export.²¹ Initially, most of the European clocks imported into China found their way into the collection of the emperor or the possession of members of the impe-

rial family. However, as the trade increased toward the end of the century, the clientele grew to include those outside the court, officials and members of the Chinese elite as well as Europeans who purchased these foreign “toys” to present them to the emperor as means of gaining favor. As George Staunton, secretary and minister plenipotentiary of the Macartney embassy of 1793, reported:

Extraordinary pieces of ingenious and complicated mechanism, richly and variously ornamented, and producing, by means of internal wheels and springs, apparently automatus movements, were exported annually to a considerable amount. These machines, taken over thither at the express desire of the Mandarines, whom it might have been dangerous to disobey, were either given as presents, or a trifling sum, infinitely less than the first cost, was received in return, that the transaction might have the appearance of a common purchase. Many of these costly articles, obtained by the Mandarines, under promise of protection from their *inferiors*, ultimately found their way into the palaces of the Emperor and his Ministers, in the hope of securing the favour of their *superiors*.²²

Cox's clocks with their elaborate automata were very popular when they were first introduced to the Chinese court in the mid-1760s, and they initially commanded very high prices on the market. With their intricate detail, fine movements, rich materials, and abundance of colored stones and painted enamels, these pieces appealed to Chinese taste. Cognizant of the demand for elaborate clocks in the Chinese court and in China generally, Cox had written in his catalogs that he designed pieces that he believed would appeal to Chinese taste. His objects combined “Eastern magnificence with European taste and skill.”²³ These pieces were magnificent in their ornamentation and size, judging from both extant pieces and the catalog descriptions written by Cox himself. The popularity of Cox's elaborate automata is evidenced by the number of extant pieces in the former imperial collection, now in the Palace Museum, Beijing. Simon Harcourt-Smith's catalog of European clocks and watches in the Palace Museum and the Wuyingdian (Hall of Heroism), both located within the walls of the Forbidden City in Beijing, lists eighteen clocks by Cox. In the more recent *Qinggong zhongbiao zhencang* (Precious collection of Qing-dynasty palace clocks), nineteen items by Cox are illustrated along with three sets of watches. However, only two correlations between these pieces and those listed in Cox's “descriptive” catalogs of “superb and magnificent pieces of mechanism” have thus far been made.²⁴

Cox constructed pieces specifically for the Chinese emperors; the earliest recorded piece is the pair of clocks commissioned by the East India Company mentioned above.²⁵ Each was made of gold in the form of chariots embellished

with rubies and diamonds (fig. 15). A woman sits atop the chariot with one arm resting on the clock, the face of which is signed “Jas Cox London.” A small bird that flutters rests on the finger of one hand; in the other is a circular rotating ornamental piece atop a fluted rod. A double umbrella is mounted overhead, surmounted by a jeweled dragon. At the front of a chariot by the feet of the female figure sits a dog made of gold; nearby two small birds (which are attached to springs) pop up and appear to fly away from the chariot. A small figure of a man in Oriental dress supports one end of the chariot as if pushing it. According to William Meyrick’s report of 1868, in which he describes one of the pair of clocks, the owner, a Bond Street art dealer “well known alike for his knowledge, good taste and integrity,” purchased the piece from a French officer in Paris who claimed to have acquired the clock from the Summer Palace at Beijing in 1860.²⁶ Meyrick’s account also includes an engraved life-size illustration of the piece (fig. 16). There is no doubt from the description given of “two curious clocks, intended as presents from the East India Company to the Emperor of China,” in the *Gentleman’s Magazine* of 1766 that these pieces are one and the same. One of the pair is presently in the collection of the Metropolitan Museum of Art in New York.

Cox sent many other pieces to China. According to the *St. James’s Chronicle* of 1772, a shipment of English automata sent to China had been turned back, “owing to the arrival of a Ship with a very large Collection, that was originally designed for the Spring-Gardens Museum, which struck the Chinese with so much astonishment, that the Whole was purchased for the Emperor, and no other was then admired, or would sell.”²⁷ In 1773 it was reported that over the years Cox’s pieces for the foreign market fetched more than five hundred thousand pounds sterling.²⁸

Cox was proud that his creations had found their way into such an important collection, and he used this to advantage in his catalog descriptions of other pieces offered for sale. In his catalog of March 2, 1772, Cox pointed out that his “Piece the Fifteenth,” a chronoscope, was not only “the fellow” of one that could be found in the palace of the emperor of China, but “far exceeds that, on account of many great additions and improvements.”²⁹ The original chronoscope was sent to Guangzhou in 1769 aboard the Indiaman *Triton*.³⁰ Of the “superb Horse and Tent, accompanied with two magnificent Vases of Flowers,” that played twelve tunes while the flowers were in motion, he states that a “set much inferior was the year before last purchased for the Emperor of China, and conveyed from Canton to the city of Pekin, where they remain with the Chronoscope in the imperial palace, as lasting monuments to British ingenuity.”³¹ A “Horse and Tent” similar to that listed in Cox’s catalog may be found in the collection in Beijing and is without a doubt that which was sent aboard the *Triton* and to which Cox refers (fig. 17).³²

However, the successes of the early 1770s were not to last. Cox’s company



Fig. 15. Automaton in the form of a chariot pushed by a Chinese attendant and set with a clock, James Cox, 1766. Height 25.4 cm. Metropolitan Museum of Art, Jack and Belle Linsky Collection, 1982.60.137.

declared bankruptcy in November 1778.³³ In 1779, Cox's assets were sold in two installments, the first by Christie's in March, and the second scheduled for October, although there is no record of this sale.³⁴ In 1780, James's son, John Henry (d. 1791),³⁵ traveled to Guangzhou "for the benefit of his health,"³⁶ arriving in 1781, and established the shop of James Cox and Son there sometime

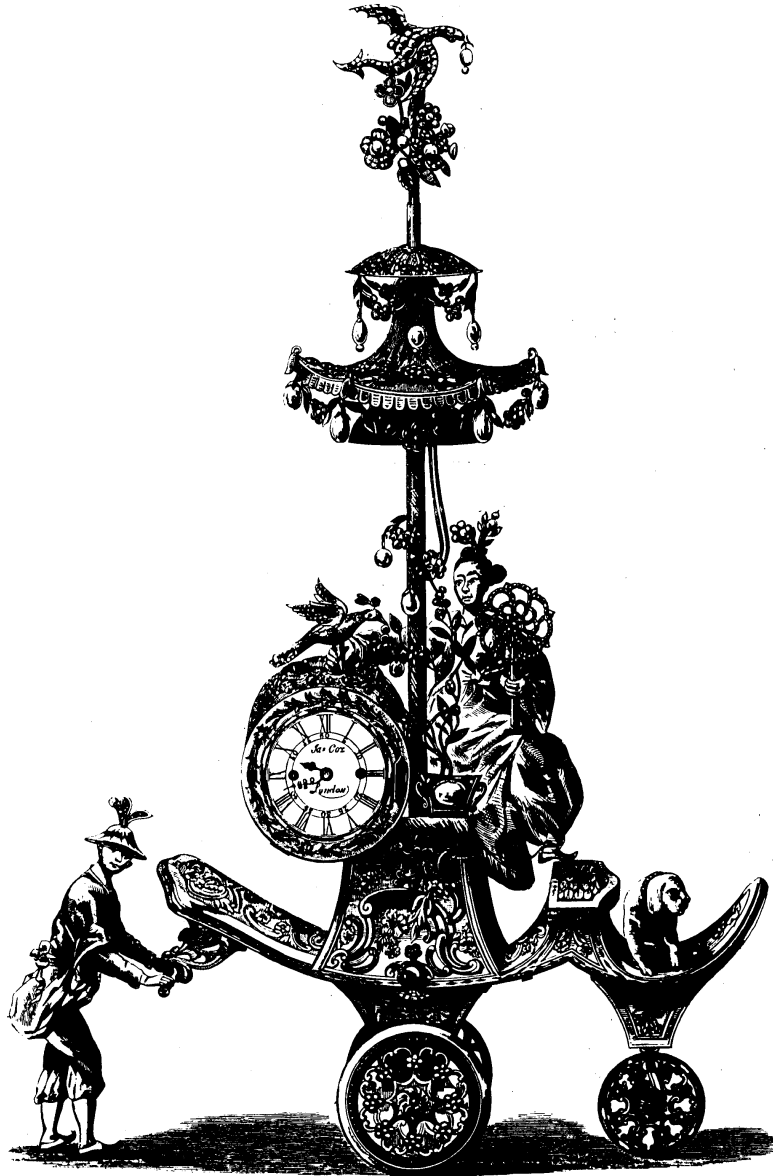


Fig. 16. Chariot clock, James Cox, 1766. (William Meyrick, *A Short Account of the Remarkable Clock Made by James Cox* [1868].)

within the next two years.³⁷ Private traders were restricted at that time by the monopoly held by the British East India Company, in effect until 1834. However, the younger Cox received special consideration by the Court of Directors in London to remain in China to conduct business that was not in conflict with that of the Honourable Company³⁸ and was allowed to sell his clocks and automata for a period of three years.³⁹ Interestingly, the Guangzhou firm of James Cox and Son was the earlier incarnation of the venerable trading com-



Fig. 17. Clock in the form of a horse and tent, James Cox, ca. 1772. Height 238 cm. Palace Museum, Beijing.

pany of Jardine, Matheson & Co.⁴⁰ John Henry Cox divided his time in the Far East between Guangzhou and Macao, where he was described by another foreign resident, Major Samuel Shaw (d. 1794), the first American consul at Guangzhou, as “an English gentleman (whose father established the celebrated museum), who deals largely in all sorts of clockwork and jewelry, and is the consignee of most of these articles brought to Canton.”⁴¹ The company sold a number of items including clocks, watches, and “sing-songs,” a term that referred to anything with a small jeweled singing bird including musical bird-cages and the popular snuffboxes that when opened revealed its hidden bird.⁴²

James Cox and Son continued to operate in Guangzhou until at least 1787, as is revealed in the company records from the Geneva watchmaking firm of Jaquet-Droz et Leschot, which sent a number of pieces through their London agent Henri Maillardet (b. 1715) to Cox in China.⁴³ Many of the watches and clocks were sent in pairs. It was mistakenly thought by Westerners that one reason for the popularity of pairs of watches was that the Chinese believed that while one watch “slept,” the other was “awake” to keep time.⁴⁴ Although the Chinese usually wore only one watch at a time,⁴⁵ pairs of watches were sold in great numbers in the eighteenth century. It seemed that Chinese collectors liked to display twin watches, either in cases or hung on the wall.⁴⁶

Eventually John Henry Cox decided to expand his business interests. He acted as the agent in Guangzhou for British merchants in India and for officers of the East India Company in China. He purchased two ships with which he joined the cotton and opium trades.⁴⁷ It seems that in doing this, Cox violated his agreement with the East India Company. A letter written by the governor-general at Bengal to the Select Committee at Guangzhou mentions complaints from merchants in India who described

obstructions which they have met with in their mercantile adventures at Canton . . . they have ventured to assert that some of the Supercargoes have engaged in private trade, which they partly carry on under the name of Mr Cox, a free merchant, and in many instances made use of their influence to force private traders to buy and sell their opium and other commodities upon disadvantageous terms.⁴⁸

Cox was forced by the company to leave China; the experience also kept any other “free merchant” from trading in Guangzhou. Cox did return, however, under the flag of other nations. Having previously investigated the possibility of joining the fur trade,⁴⁹ in 1785, he entered the North American fur market for the first time. This endeavor was a financial success and led to the establishment of the Bengal Fur Society, which dealt in North American furs for the Chinese market.⁵⁰ In 1788, John Henry Cox went to America with the financial backing of Gustav III of Sweden; he returned in 1791, supported by the Prussians.⁵¹

When Cox returned to Guangzhou, he did so not as a citizen of Britain, but rather under Prussian authority and accordingly was allowed to enter. In exploiting this legal loophole, Cox was merely following the precedent set by John Reid in 1779, a Scot who came to Guangzhou carrying papers as the consul and head of the Imperial Factory for Austria. Reid, who had been forbidden to conduct business in China as a British citizen, was thus allowed to trade. He held his commission until the Austrian Imperial Factory went bankrupt eight years later.⁵²

As the trade in mechanical devices grew, merchants were ordered to acquire more of these kinds of clocks, and “sing-songs” soon flooded the market, so that many were sold at prices less than they had cost to produce. For the company of James Cox and Son, as well as for others hoping to profit from the trade, this led to heavy losses. In 1794–95, Joseph de Guignes (1721–1800), the interpreter for the Dutch embassy to China under Isaac Titsingh, reported watches being sold at discounted prices. One item in particular, a gold watch worth 120 livres, was sold for a fraction of its value at twenty-two taels.⁵³

This situation was made worse by the number of private traders also vying for a portion of the trade. These competitors included captains of East India Company sailing vessels bound for China who were given free storage space, up to fifty-six tons,⁵⁴ to carry goods for trade on their ships. These men realized that the only goods in which the Chinese were interested were “chiming watches, and clocks and musical boxes.”⁵⁵ In 1783, John Wordsworth, captain of the Indiaman *Earl of Sandwich*, carried “one pair high finish’d Horizontal Stop Watches Musical and Chime, Cap’d and Jewell’d they do not stop whilst winding up they Chime the Quarters and strike the Hours as they go and play a Tune at pleasure by pushing the pendant.”⁵⁶

Captain William Mackintosh, who worked for the East India Company, also engaged in private trade and supplied clocks and watches to the Macartney embassy to China of 1793.⁵⁷ He was in command of the Indiaman *Hindustan*,⁵⁸ the vessel that conveyed to the capital the embassy’s gifts to the Chinese emperor. Mackintosh saw this as his chance to conduct trade in Beijing; Macartney, however, restricted Mackintosh’s commercial activities to Guangzhou.⁵⁹ Mackintosh, thus limited, still managed to conduct £7,480 in private trade from the voyage, with the total private trade on the *Hindustan* amounting to £9,633.⁶⁰ Captain Mackintosh sold a number of items to the embassy, including “Parker’s great lens, which he brought out with him on a speculation,”⁶¹ and watches.⁶²

Thus, by 1788, the firm of James Cox and Son was in serious financial trouble. Not only did it employ its own workmen in London, but it was partially responsible for those in the factories of Jaquet-Droz et Leschot in Geneva, which supplied a number of the mechanisms, and for those of Henri Maillardet, the firm’s partner in London.⁶³

Although James Cox died in late 1791 or early 1792, his Shoe Lane shop in London carried on until 1795.⁶⁴ In China, however, the company of James Cox and Son never really managed to surmount its financial problems. The company changed its name with surprising frequency, reflecting changes in partnerships. In 1787, John Henry Cox joined with Daniel Beale (1759–1827), the purser for one of the East India Company’s ships, to form the company of Cox and Beale. Beale held consular papers for the king of Prussia, and as he was the agent for a foreign government, he could not be expelled from China by the company.⁶⁵ Beale managed the shop during Cox’s many absences. When John Henry Cox died in the early 1790s, he was succeeded by Beale’s brother, Thomas (d. 1841), who was allowed to stay in China, for he held the position of secretary to the Prussian consul.⁶⁶

Thomas Beale was active in the China trade from about 1787 and was involved with the company until 1815. Upon the departure of his brother Daniel in 1797, he took over as Prussian consul. He settled in Macao and became well known for his botanical garden and exceptionally large aviary, “a curious and valuable collection,”⁶⁷ both of which were mentioned by a number of Western writers in China in the first half of the nineteenth century.⁶⁸ The main attraction was the live bird of paradise Beale had kept for eighteen years.⁶⁹ Unfortunately, in the last years of his life Beale owed a great deal of money, approximately five thousand pounds, to the Missions Etrangères that he was unable to pay in full owing to poor performance by his speculations in opium. His mortal remains, identifiable only by the clothing, were discovered half-buried on the beach one month after he was last seen.⁷⁰ Louis Bovet, himself a maker of mechanical pieces for the China trade who came to Guangzhou in 1841, wrote to a friend that “Mr. Beale disappeared; the birds are for sale.”⁷¹

In 1792 the company of Cox and Beale changed its name again, becoming Cox, Beale and Laurent. The new partner, Félix Laurent, a Frenchman from Saint-Hippolyte, had been resident in Guangzhou during the late 1780s and worked in the clock and automata trade. He, too, received pieces from Jaquet-Droz et Leschot in the years 1787 to 1789.⁷² The firm was renamed Beale, Reid and Company in 1793 with the addition of David Reid, a Scot who held his commission under the Danish government.

From 1799, the firm underwent a number of name changes, becoming Hamilton, Reid and Beale in that year; Reid and Beale in 1800; Reid, Beale and Co. in 1801; and Beale and Magniac in 1803. The latter eventually split to form Beale and Co. in 1811 and Magniac and Co. in 1817.⁷³ In 1832, the company adopted the name by which it is still known, after two of its partners, William Jardine and Nicholas Matheson.⁷⁴

Even after James Cox’s death around 1791 and despite the various changes to his company, Cox’s clocks were still a feature of the trade. His pieces were in favor with the Qianlong emperor, and during the embassy to China in

1793 Macartney presented a musical clock by Cox and W. H. Craft to the emperor.⁷⁵

By the time of the arrival of the Macartney embassy in 1793, a substantial number of Cox's clockwork automata were part of the imperial collection. Both Sir George Staunton, secretary and minister plenipotentiary for the embassy, and J. C. Hüttner, tutor to Staunton's son, made particular reference to Cox's pieces when they visited Jehol.

While the gentlemen of the Embassy were going through the several buildings in the gardens of Zhe-hol, they were glad of any opportunity of expressing, through civility to their conductors, their approbation of what they saw, wherever they found room for praise; and they were certainly not backward in concurring in the general admiration of the pieces of mechanism already mentioned, which formed part of that curious and magnificent collection, called Cox's Museum, which had been made, and was formerly shewn in London; but the General, inferring from their applause, that the sight was novel to them, exultingly demanded, whether such performances were to be found in England; and was not a little mortified to learn, that it was from thence they came to China.⁷⁶

According to Hüttner, within the “many palaces that merit to be seen,” he noted that “the grand ornament of these palaces consists of English clocks with chimes, most by the hand of the celebrated Cox.”⁷⁷

An enchanting account relating to Cox's clocks and automata in China is that written by the twelve-year-old George Thomas Staunton (1781–1859) in 1793. He traveled to the East with his father, Sir George Leonard Staunton (1737–1801), as page to Lord Macartney with his embassy. He developed remarkable facility with the Chinese language, having studied under the two Chinese interpreters who traveled with the embassy.⁷⁸ Of young Staunton's ability, Lord Macartney wrote in his journal that “Little Staunton was able to supply my wants on this occasion, for having very early in the voyage begun to study the Chinese [language] under my two interpreters, he had not only made considerable progress in it, but he had learned to write the characters with great neatness and celerity, so that he was of material use to me on this occasion, as he had been already before in transcribing the catalog of the presents.”⁷⁹

Staunton was much admired by the members of the Chinese court, and at an audience with the Qianlong emperor in September 1793 at Jehol, he was presented with a small yellow silk purse, having impressed the emperor with his spoken Chinese. Staunton wrote in his diary: “The Emperor gave my Papa such a stone as he gave the Ambassador, and took one of the little yellow purses hanging by his side and gave it to me. He wished I should speak some Chinese words to him which I did, thanking him for his present.”⁸⁰ In later

years, Staunton worked for the East India Company at Guangzhou and accompanied the Amherst embassy to China, eventually returning to England and becoming a member of Parliament.⁸¹

Staunton’s diary gives vivid descriptions of the strange and wonderful sights he experienced in China. He first mentions elaborate clocks in his entry for Sunday, December 29, 1793.

[T]his evening we went to see some curious machines in clockwork (singsongs) at Capt Macintoshes factory. one among the others was particularly curious being a Beautiful piramid with golden serpents continuously twirling upon it and four Dragons at its Base Spitting Pearls, and Round it is continually Walking an Elephant who at the same time both moves his trunck and tail.⁸²

The piece to which Staunton here refers is likely the chronoscope Cox constructed in 1772 and offered for sale in one of his catalogs in 1773. According to the catalog description, it had “a very rich and curious Elephant that goes round the table from springs” and could move its trunk. It was “in many respects like life, extending and contracting it in as animating manner as art can perform.” It also had four dolphins and dragons that spat pearls, gold and silver. In the center stood an obelisk of “immense workmanship” with entwining serpents. This piece is based on an earlier work by Cox: his famous chronoscope, made in 1769 and sent to Qianlong.

The next day, young Staunton wrote of meeting a Mr. Beale,⁸³ who showed the group a collection of “a great many curious machines in Clock work such as came from *Coxs Museum*.”

[A]mong others was a little *Automaton* [here “Boy of wood” has been crossed out] who drew perfectly well *the Prince of Wales leaning on his horse* and a *Dog* at the same time moving his head and eyes
in another was a little *automaton* that danced and made divers odd attitudes upon the tight rope
in another was a large pile of fruit with a dog near it, and if you took away a loose piece of the fruit the dog began to Bark.⁸⁴ in Another a large Stag and the Dancing dogs and Bear. in another were some small pictures and Different, and any one of which being put in a certain place in the lower part of the machine immediately there appeared a similar one at the Top. All these machines accompanied these motions with very pretty music of Bells.⁸⁵

In 1795, the Dutch embassy to China under Isaac Titsingh also made a gift of two large clocks from Beale of Guangzhou to the emperor at Beijing.⁸⁶ In

his journal André Everard Van-Braam Houckgeest noted that with the Hoppo (from the Chinese *hubu*, a court-appointed trade official) and four or five of the principal mandarins, he went to Beale's shop, where they found offered for sale a number of pieces of mechanics.⁸⁷

Later, in 1805, the French traveler Félix Renouard de Sainte-Croix made observations concerning the great number of clocks belonging to the company formerly known as Cox and Beale:

The house of Misters Beale was started by a Mr. C*** [Cox], who established a shop of mechanical objects where one could find and find again all that was the most curious in Europe in this genre. These objects were sold to the mandarins at exorbitant prices that were a little reduced because in China there is no one who could repair these pieces of mechanics when they happened to break down. It is at this shop that one may see an automaton write the name of the emperor of China in several characters. One may also see pendulum clocks, vases, watches, etc., costing four, ten, and twenty thousand piastres.⁸⁸

He also mentioned pieces still in stock that were difficult to repair as they had rusted as a result of the humid south China climate.

There were other London makers of elaborate clockwork who sent pieces to China at the time of James Cox; but few of them were able to attain his stature in both home and foreign markets. For example, John Barbot, of England, whose shop was located on Great St. Andrew's Street, also made clocks for the Qianlong emperor, and four of these are still in the imperial collection.⁸⁹ Another well-known maker was Timothy Williamson (active from 1769 to 1788),⁹⁰ whose name is found on eleven pieces in the collection in Beijing.

JAQUET DROZ ET LESCHOT

Although the majority of the clocks and watches in the imperial collection were products from London, it was the makers from Geneva and other locations in the Swiss Jura who gained special recognition, not from the quantity of products they made for China, but for the quality, which far outshone that of the English pieces.⁹¹ In the eighteenth century, competition between these centers was fierce, particularly between makers in Geneva and La-Chaux-de-Fonds, including nearby Neuchâtel, who vied with each other for increased market share and profits. Although they were overshadowed by the British makers in the eighteenth century, their willingness to adapt their designs for their clients ensured their great success in China, and by the first quarter of the

nineteenth century, they claimed supremacy. Their international dominance has continued to the present day.

The watchmakers of Geneva had had a long experience with foreign markets, where the risks and inconveniences associated with such distant commercial endeavors were great, but so were the potential profits.⁹² Contact with the Turkish market began as early as the late fifteenth century, when makers were asked to send chiming clocks to Constantinople as tribute,⁹³ and by the early seventeenth century Turkey had a colony of Genevan clockmakers, as some enterprising craftsmen moved to Constantinople to take advantage of the trade.⁹⁴ Records from the second quarter of the seventeenth century show that makers in Geneva continued to construct pieces specifically for Turkey.⁹⁵ China did not become a part of the foreign trade until the eighteenth century.

Clock making developed rapidly in seventeenth-century Geneva. A city famed for jewelry manufacture, it attracted a number of highly skilled Huguenot craftsmen, including watchmakers who were escaping Catholic persecution in France. As the numbers of these watchmakers increased, a guild was formed in 1585. With the revocation of the Edict of Nantes in 1685, still more skilled refugees arrived, so that by the late seventeenth century some of the finest watches in Europe were being made in Geneva.

The rapid growth of the industry beginning in the late seventeenth century necessitated a change from the *fabrique* system, where the master, journeymen, and apprentices worked together with specific divisions of labor, to a more efficient method known as the *établissage*, under which a skilled master, known as the *établisseur*, organized everything from wages, to raw materials, to taking the finished articles to market. It encouraged the *établisseurs* to expand their activities to include marketing and thereby to act as merchant-manufacturers, with associates serving as agents in other markets, such as those of London and Paris, in order to increase the demand for their watches.⁹⁶ This expansion eventually included Asia. By the late eighteenth century, the *fabrique* system was essentially defunct.

Finding success in markets that had existing native clock-making traditions, the Geneva makers prepared to enter those where there was no watch industry: Italy, Spain, Russia, and, toward the end of the eighteenth century, China. From the last quarter of the seventeenth century until the mid-eighteenth century, under the streamlined *établissage* and with the increased number of markets, Geneva watchmaking had changed from a local industry to the second largest producer in the world.⁹⁷ The division of labor was so well defined that there were now approximately thirty different trades that contributed to the making of a clock or watch, including goldsmiths, silversmiths, engravers, gem cutters, and dial makers.⁹⁸ There was a short period in the mid-1780s when domestic problems caused production to fall, but by the early nineteenth century, the industry had recovered, owing in part to the *établis-*

sage system being set up in areas other than Geneva, Neuchâtel, and La Chaux-de-Fonds: in Locle, Val-de-Travers, and Fleurier, located in the approximate vicinity of Neuchâtel.⁹⁹ The eventual modernization of these small workshops with the coordination and distribution offered by the *établisseurs* ensured the success of the industry.

It was in the period from around 1750 to 1785 that Jura clockmakers entered the Chinese market, one that they would come to dominate in the nineteenth century. Much of what is known about this period comes from the writings of the traveler Charles de Constant de Rebecque (1762–1835) who is credited with promoting European watchmaking in China. Constant had a keen interest in commerce and was particularly fascinated by the watch business. In 1779, at the age of seventeen, he made his first voyage to China on a vessel chartered by Joseph II of Austria, who was hoping to establish a trading “factory” at Guangzhou. Constant stayed at Macao for three years, returning home in 1782 only to return again the next year. On this second trip, he remained until 1786. He made a third trip to Guangzhou from 1789 to 1793.¹⁰⁰ These voyages to Guangzhou and Macao and the resulting travel account, *Récit de Trois Voyages à la Chine* (1779–93) earned Constant the nickname “le Chinois.”¹⁰¹ Constant’s keen observations on the merchandising of clocks and watches in China and on Chinese customs are recorded in his journal and letters, totaling around 150 volumes preserved in the Bibliothèque de Genève.¹⁰²

Constant had a strong interest in business and was a good observer of Chinese customs. He himself traded in a variety of merchandise, acting both as importer and exporter. As a businessman himself and one who felt a certain sense of national pride, he questioned the British dominance of the industry in south China. He believed strongly that clocks and watches by Geneva makers could fare well in competition with those from England. He could see no reason why Swiss and even French products should take a back seat: not only were they of better quality but they certainly surpassed the English models in “elegance of form.”¹⁰³ He also noted the irony in the smuggling of Swiss and French watches by the English into their own country. These items could be hidden easily from customs officers, often in something odoriferous such as fish, and were easily disposed of.

For his own business, Constant was specific in the assortment of watches he wished. On at least two occasions in correspondence with his family, Constant mentioned that it was of utmost importance that the watches come in “scrupulously exact” pairs, so that they could not be told apart at first glance. In a letter of January 19, 1784, he complained that the watches sent to him did not sell because they were not in identical pairs and in some cases were not in working order.¹⁰⁴ He kept careful notes in his journal regarding Chinese preferences in clocks and watches: cases of gilt bronze and colored marble were

fine, but alabaster must be avoided, as the Chinese did not like it. The cases should be of gilt bronze or mahogany, embellished with colored stones, enamels, glass, musical devices, and mechanical “toys.”¹⁰⁵ The price for these, he continued, should not surpass fifteen to twenty thousand francs, and at that price he would accept only one or two pairs of clocks. The whole assortment shipped to him should not be valued at more than 100 to 120 thousand francs; if care were exercised in following his recommendations, a decent profit could be realized.

Some of the most talented makers who were supplying watches at the time Constant operated out of Guangzhou were Pierre Jaquet-Droz (1721–90), his son Henri-Louis (1752–91), and Jean-Frédéric Leschot (1746–1824), all of whom worked together and with whom James Cox worked closely. This famous partnership was responsible for creating some marvelous automata as well as beautifully made clocks and watches. A number of watches, clocks, and sing-songs sent to China carried the signature “Jaquet-Droz et Leschot.”

The talented Jaquet-Droz family came from the town of La Chaux-de-Fonds, an area in the Swiss Jura known for clock making since 1700 and located just northwest of Neuchâtel. Pierre Jaquet-Droz was famous for carrying on the work of his mentor, Jacques de Vaucanson (1709–82), a noted French mechanic and a designer of textile and other industrial machines. Vaucanson studied anatomy, music, and mechanics in Paris. In 1738, he presented his first automata, which he referred to as “sublimes jouets,” to the Academy of Sciences.¹⁰⁶ In 1738, he exhibited his most famous piece, an automaton in the form of a duck.¹⁰⁷ Considered by some to be “perhaps the most wonderful piece of mechanism ever made,” it had ingenious movements that are worth mentioning here, from an early-nineteenth-century account:

Vaucanson’s duck exactly resembled the living animal in size and appearance. It executed accurately all its movements and gestures, it ate and drank with avidity, performed all the quick motions of the head and throat which are peculiar to the living animal, and like it, it muddled the water which it drank with its bill. It produced the sound of quacking in the most natural manner. In the anatomical structure of the duck, the artist exhibited the highest skill. Every bone in the real duck had its representative in the automaton, and its wings were anatomically exact. Every cavity, apophysis, and curvature was imitated, and each bone executed its proper movements. When corn was thrown down before it, the duck stretched out its neck to pick it up, it swallowed it, digested it, and discharged it, in a digested condition. The process of digestion was effected by chemical solution, and not by trituration, and the food digested in the stomach was conveyed away by tubes to the place of its discharge.¹⁰⁸

Pierre Jaquet-Droz began his studies in theology at Basle, later turning his attention to philosophy. While studying the humanities, he became acquainted with mechanics, and it is likely that he would have been acquainted with both the great mathematician Jean Bernouilli (1667–1748), and his son, the physician Daniel Bernouilli (1700–1782), both of whom were at the university, sometime in 1738 or 1739.¹⁰⁹

Pierre Jaquet-Droz returned to La Chaux-de-Fonds, and around 1740, he began his long apprenticeship as a clockmaker. By 1758, he was constructing pieces for foreign markets and had traveled to Madrid, transporting some of his "constructions extraordinaires" to the Spanish court. These included a clock in the form of a gilt bronze cage with a singing bird, a perpetual motion clock, and a figural automaton that answered numerical questions by hitting a drum. This figure in particular created quite an impression at the court.¹¹⁰ In 1759, he made another very successful second trip to Spain, where he was able to show off his skill to its best advantage. Unfortunately, he had to return to Switzerland, having apparently suffered a nervous breakdown from overwork.¹¹¹ However, the trip to Spain secured his fame; his name became known throughout Europe, and it created a wealthy clientele for his work.

Probably around 1756, Pierre Jaquet-Droz took into his home the young Jean-Frédéric Leschot. There Leschot studied the mechanical arts with Pierre's son, Henri-Louis. In 1767 Henri-Louis left for Nancy, where he studied mathematics, design, and music, while Jean-Frédéric remained at La Chaux-de-Fonds, where he continued his study of mechanics under the elder Jaquet-Droz. By 1769, Pierre Jaquet-Droz and Leschot were collaborating on a number of clocks. Eventually Jean-Frédéric became one of the main partners of the firm of Jaquet-Droz.¹¹²

Henri-Louis returned to La Chaux-de-Fonds in 1769 but in 1773 left for England, to establish in 1774 a branch of the business in London, where mechanical pieces, many made specifically for China, could be both manufactured and sold.¹¹³ A prospectus of 1775 describes four of their pieces, each one more extraordinary than the next.¹¹⁴ One was a writer automaton in the form of a two-year-old child whose eyes followed the text as he wrote. This was constructed by Pierre. The second piece was of a little draftsman; the third a musician, a young girl of ten or twelve years of age who played a *clavessin organisé*. Each finger moved individually. The fourth piece was a fantastic grotto with moving figures. Among his other notable work is an automaton that could draw the profiles of Louis XVI and Marie Antoinette.

The writer automaton aroused particular interest among all who observed it. Mlle Suzanne-Louise Nicolet, a friend to the Jaquet-Droz family, wrote to her brother in 1776:

Mr Jaquet-Droz is in London with his pieces. . . . I have been tempted many times to send you the printed description of all these marvels. You

appear not to believe what you have heard. I would like to send you the writing by the writer automaton and a drawing by the designer automaton. I myself have seen it write what one dictated to it without it appearing that anyone touched it and saw its eyes following along as it wrote, and I have seen the other draw and examine its work.¹¹⁵

Under the direction of Henri-Louis, the London branch of the firm sent many of its best pieces to China. In 1783, Henri-Louis set up an equal partnership with Henry Maillardet (b. 1745), one of Neuchâtel's premier makers of watches and a good technician in his own right who had been in London since 1772.¹¹⁶ He was the son of Henri Maillardet, himself a descendant of a long line of mechanics.¹¹⁷ The old family firm of Jaquet-Droz et Leschot still continued at La Chaux-de-Fonds, but in 1784, under Henri-Louis, the head office was moved to Geneva.¹¹⁸ At each branch, watches, clocks, automata, snuff-boxes with automata, astronomical clocks, all bejeweled and enameled, were made and sold.

The company was able to sell pieces through agents in Paris and London; however, it was Guangzhou that proved the most profitable outlet for selling products of the Jaquet-Droz factories. The surviving ledger and inventories of the factory from 1781 to 1791 yield a wealth of information.¹¹⁹ The *maison* was very active in the years 1784 to 1786 and at its height between 1786 and 1787. In these years, most of their production was absorbed by China. All objects were sent in pairs, as was required by the Chinese buyers.¹²⁰

Following years of success, the company then suffered losses in the years 1788 and 1789, mainly because their primary agent in China, most probably Cox and Beale of Canton, had a large bill outstanding. An important London client was also in financial trouble, which forced Jaquet-Droz to end its association with Henri Maillardet, as the business there performed poorly. Soon afterward, in 1790, Pierre Jaquet-Droz died, followed the next year by his son Henri-Louis. The business was then liquidated. In 1792, the company of Cox, Beale and Laurent of Guangzhou¹²¹ defaulted on their bill of £4,570 owed to Jaquet-Droz et Leschot. With the deaths of Pierre and Henri-Louis Jaquet-Droz, the company was left to Leschot as successor. Political and economic conditions made business difficult, and the trade in luxury goods was never again to reach the previous level.

The firm of Jaquet-Droz et Leschot constructed a number of pieces for China, including “sing-songs,” clocks, and automata. According to Jean-Frédéric Leschot's granddaughter, Marie, the firm made a large astronomical clock by order of the king of England that was then offered to the emperor of China.¹²² Félix Laurent, who had once worked for Jaquet-Droz, was in charge of setting up the piece in China, after which he settled in Guangzhou and worked as a watchmaker, later, in 1792, becoming one of the partners in the firm of Cox, Beale and Laurent. The fate of this astronomical clock is

unknown. Among the famous presents given by George III by the Macartney embassy of 1793 was an orrery (a type of astronomical clock) purchased from William Fraser of London.¹²³ Perhaps Jaquet-Droz et Leschot had a hand in its creation, but this remains speculative.

There is yet another Jaquet-Droz et Leschot piece that has a connection to the Macartney embassy. According to a document in the Patent Office, London, dated August 26, 1812, “Earlier reference has been made in the most glowing terms to a copy of the Draughtsman made by Jaquet-Droz himself, and bought at a colossal price for the King of England, at whose order it was sent to Lord Macartney (1792) on the occasion of his mission to China as a compliment to the Chinese Emperor, who has it in his private collection at Peking.”¹²⁴ The object to which this document refers is an elaborate automaton of a man in eighteenth-century French court dress who sits at a table, dips a brush-pen in ink and writes the Chinese characters “Ba fang xiang hua, jiu tu lai wang” [From all directions they come to be converted, and all lands pay tribute to the ruler]. While none of the material relating to the Macartney embassy mentions this automaton, it does correspond to a piece sent to the Chinese court via Guangzhou in the years after Macartney’s voyage.¹²⁵ This is most certainly the automaton now incorporated into a large musical clock by Timothy Williamson, now in Beijing (fig. 18). Documents from the Jaquet-Droz workshop preserved in the Historical Museum at Neuchâtel include drawings made by several automata, including one that could write the Chinese phrase.¹²⁶ There is little doubt that these automata are one and the same, and that the elaborate Jaquet-Droz figure was incorporated into Williamson’s larger piece.

Beginning in 1783, Jaquet-Droz et Leschot sent pieces to China through James Cox and Son. Their extant account books reveal that over the next four years, they sent to James Cox and Son in Guangzhou a wide assortment of watches, some of which chimed: they were often made with elaborate enameling, pearl borders and gemstones, and almost always in pairs.¹²⁷ They also sent parts, including enameled clockfaces and keys. In the accounts for 1783, Cox was sent two pairs of elaborate sing-songs in the form of birdcages. One set was ornamented with palm trees, a jumping bird, a “glory” (a jeweled roundel that spins), cascades, two doors that opened, and a double spiral in the center of the cage.¹²⁸ This description corresponds to a birdcage clock signed by Cox and dated to 1783, now in the Palace Museum, Beijing (fig. 19).¹²⁹ Twelve palm trees with pineapples encircle the cage, on the top of which is a large pink and green glass-paste star that spins. At the appropriate time, an enameled bird in the cage trills a tune, hops between perches, flaps his wings and moves his head. A clockface is inset in the base of the cage. The correlation between these pieces may suggest that James Cox had elements for his creations made for



Fig. 18. Gilt bronze musical clock with automaton by Jaquet-Droz et Leschot, Timothy Williamson, ca. 1780. Height 231 cm. Palace Museum, Beijing.



Fig. 19. Musical birdcage with automata and clock, James Cox, dated 1783. Height 76 cm. Palace Museum, Beijing.

him elsewhere and that he incorporated them into his pieces and added his signature.

Prices were given for many of the pieces. In 1786, Jaquet-Droz and Maillet in London sold to Cox and Son a pair of repeating clocks in the form of a “bureau,” with a cascade, a spiral, and rotating pineapples, valued at £126.

An elaborate pair of cages with two birds, a temple above the cage, and bells that sounded on the hours and quarters, was priced at £1,200.¹³⁰

The pieces produced in the workshops of Jaquet-Droz et Leschot were nearly always signed. These signatures include “Jaquet-Droz London,” “Jaquet-Droz,” “Jaquet-Droz & Leschot London,” and “Pierre Jaquet-Droz à la Chaux-de-Fonds.”¹³¹ Strangely, however, there are very few pieces that carry the Jaquet-Droz et Leschot name in the collection of the Palace Museum, Beijing.¹³²

The short period of activity in the 1780s in the Chinese market did not allow the eighteenth-century Swiss makers to establish a strong presence. However, their experience was valuable for later makers. With the resurgence of the watchmaking industry in Geneva, Neuchâtel, Fleurier, and La Chaux-de-Fonds, the Swiss reentered the Chinese market in greater numbers in the nineteenth century, surpassing the makers from other countries.¹³³ These Swiss makers included the Bovet family, which came to prominence in the early nineteenth century and made the area of Fleurier the main center of watchmaking for the Chinese market.¹³⁴

The success of James Cox in the 1760s and 1770s and that of Jaquet-Droz et Leschot in the 1780s (with a legacy into the nineteenth century) are representative of the contrasts between the English and Swiss approaches to the Chinese clock and watch trade as a whole. Though makers from both areas were providing essentially the same kinds of pieces for the China trade as for their own markets at home, they differed in whom they saw as their main consumers, determining what they sent to China and how they sold them.

James Cox was London’s preeminent producer of clocks, whose work is well documented in his catalogs, in the writings of others, and through extant objects. These varied sources provide a more comprehensive understanding of Cox’s activities than possible with either objects or documents alone. For Jaquet-Droz et Leschot, the picture is less comprehensive. While a few of their products for the Chinese market became part of the imperial collection of clocks and watches, most of their pieces came into the hands of China’s elite and official class, making it difficult to find a single group of their watches connected to the China trade. In some cases, their creations were incorporated into the work of other makers whose signature these pieces carried, leaving the work of Jaquet-Droz et Leschot unattributed. Fortunately, the firm’s records have been preserved in Geneva, and these offer some insight into their activities relating to China.

The Chinese clock and watch market was one in which the consumers varied enormously, consisting of officials purchasing items of tribute for the emperor, the Chinese elite who purchased pieces for their own use, and members of Western embassies to the emperor who wanted an appropriate gift to present to the Chinese monarch. Just as the clientele was varied, so too did the

products they were buying, which ranged from the large mechanical fantasies with their jeweled spinning stars, music, and animated figures that Cox constructed, to the more restrained, finely worked watches. The costs of these pieces thus covered a wide range as well.

Beginning with his first pieces for Qianlong, commissioned by the East India Company in 1766, Cox concentrated on the imperial court by sending spectacular creations to China. Whether any of Cox's elaborate works were purchased by anyone for use outside the court circle is unknown. In contrast to James Cox, Jaquet-Droz et Leschot focused for the most part on China's watch market, although they did send some larger mechanical pieces as well. Less expensive than Cox's pieces, yet finely worked and certainly evocative of European art and technology that was of interest to Chinese consumers, these paired pieces appealed to China's expanding elite class of the *nouveaux riches* and officials, the result of an economic expansion in the eighteenth century. While records of such transactions have yet to surface, evidence of such ownership may be seen in paintings and literature of the period.

Having an agent in China to act for them was crucial for the European makers, but of even greater importance was an agent who was familiar with the particularities of the market in terms of design and materials and knew what prices the market would bear. Both Cox and the firm of Jaquet-Droz et Leschot entered the Chinese market at Guangzhou: Cox through the branch office of his business operated by his son, and Jaquet-Droz et Leschot through other agents, including Cox and Son. As the gateway to the West, Guangzhou was an important center for the growing Sino-European commercial ventures that contributed to the increase of wealth in the region, thus making it the ideal location for the clock and watch trade. Both large elaborate pieces and smaller watches were purchased by officials in Guangzhou as tribute for the court at Beijing, by the Chinese upper classes, and by members of Macartney's embassy. Cox relied on the already present imperial interest in his pieces to sell them to those who wished an appropriate gift for the emperor. He unfortunately did not explore the potential of the expanding market for less elaborate pieces. His son, who was uniquely positioned in the Guangzhou clock trade, acting as both salesman for his father's high-end products for the Chinese court and agent for other clock- and watchmakers, failed to take full advantage of his situation. John Henry Cox appears to have been distracted from the clock trade by his many other mercantile interests.

The Swiss makers, on the other hand, benefited from the business expertise in China of fellow countryman Charles de Constant. His keen observations on Chinese customs and his knowledge of the watch market served the makers well. His recommendations not only ensured immediate success but also revealed a willingness on the part of the Swiss makers to work with customers by offering them what they wanted at a price they were willing to pay.

This knowledge was especially valuable in such far-off markets as China. It was the search for and cultivation of these markets that brought success to the makers in the Swiss Jura: they seized upon these commercial opportunities and exploited them. It was these efforts that were to transform these clock-making areas from a local industry to a strong international force. By the second decade of the nineteenth century, these makers dominated the situation in China, displacing the British, who now lagged behind. It has been said that it was “the craftsmen-artists who made the reputation of the Geneva watch, but it was the merchant who brought him orders. No one else knew so well what would sell and what would not.”¹³⁵

It is likely that Cox was uninterested in exploring the larger market in less expensive and less elaborate goods in China, as this was not the focus of his London business. In addition, his reputation at home could only be enhanced by the fact that his principal client in China was the emperor himself. Cox operated at a time when England was enjoying the expansion and industrialization of the empire. In its highly competitive luxury goods market, Cox needed to distinguish his pieces from other expensive products by giving them a special status. In promoting his work, he encased his “pieces of ingenuity” in multiple commercial and moral meanings. Cox used his successes in the Far East to create images around them; his clocks were no longer expensive “glittering gewgaws” but were the best England had to offer. They represented national honor and British ingenuity. This was a particularly sensitive issue in the late eighteenth century, when trade imbalances with the Chinese were already problematic, forcing Britain to assume a subordinate position with respect to the Chinese.

Like many of his contemporaries, Cox undertook to work in an Eastern mode, following the established decorative arts movement known as *chinoiserie* that affected architecture, porcelain, silver, interior furnishings, and textiles. China provided Cox with the ideal endorsement for his *chinoiserie* creations: none other than the emperor of China collected Cox’s clocks, thus implying that Cox—unlike his competitors—truly understood Chinese taste. Not only did he know about “Oriental” aesthetics, but he was able to improve upon it as well. Cox found that “Asian Pomp” was often “without taste, without proper effect, and without utility,” and thus he consciously worked to combine the “brilliancy” of Oriental taste with superior English workmanship and “the enchantments of a mechanism more likely to captivate those people for their having to them the charm of novelty.” As the Chinese purchased his pieces, it was not only Cox who would benefit but all of England, “much to the honour and advantage of this kingdom.”¹³⁶ Thus, Cox would “open, for the nation, the source of this article of commerce, so as thereby to render the luxury of the East, tributary to the Industry of our Artists, and to retrieve to this country some part, at least, of those immense sums which the products and

manufactures of Asia are incessantly draining from Europe.”¹³⁷ Buying a Cox clock became an act of national pride.

Although Cox claimed to be creating pieces for the “Orientalists,” that is, the Chinese, he was in fact catering to tastes at home. With competition high, he distinguished his pieces by creating an alternative image for them within the English market; he showed no genuine desire to develop an understanding of Chinese taste. In the end, Cox’s interest in the Chinese went only as far as having it benefit his business at home. He did not make any modifications for the Chinese consumers, and he kept his focus on an exclusive market. In the end, this would be his undoing. His market eventually became too narrow to be profitable, and he was ill prepared to compete with the influx of less expensive yet exquisitely made Swiss pieces that catered not just to imperial tastes but to the Chinese elite. The heyday of British dominance was over.

However, while the English trade had entered its final decline after decades of dominance, the Swiss were beginning a period of growth. The Genevan makers entered the nineteenth century with vigor; success was ensured by the willingness of the makers to adapt their watches for this particular foreign market. The result was the “Chinese watch”: a timepiece fitted with a center seconds hand that “jumped” as it counted the seconds, and with an elaborately shaped bridge with engraved designs.¹³⁸ The lower cost of the product ensured its appeal to a wider market and guaranteed the success of Swiss watches in China. The British, however, were slow in adapting and found themselves overshadowed in a market they had previously controlled. It has been said of the nineteenth-century clockmakers that “the Swiss made watches to please the customers; the British made watches to please themselves.”¹³⁹

“To Rival Oriental Splendor”

The Aesthetic Milieu

Whether constructed in China or the West, the elaborate clocks that found their way into the Qing imperial collections were based on the current fashions in the European decorative arts. The majority of these pieces were produced in the second half of the eighteenth century in a number of different centers, the most important being London, Guangzhou, and the imperial workshops in Beijing. Although this period saw several different stylistic movements from the final stages of baroque stateliness in the early century to the formal and geometric lines of the neoclassical style at the century's end, the overriding decorative movement was the light and airy rococo. A natural extension of the rococo's whimsical asymmetry was the artistic style known as *chinoiserie*, which developed as a result of increased European interest in the East. Chinoiserie soon came to dominate the decorative arts, and for approximately thirty years in the latter half of the eighteenth century, *chinoiserie* style could be found in interiors throughout Europe. Loosely based on motifs from Chinese, Japanese, and even Indian repertoires, chinoiserie was Europe's imaginative and fanciful view of the Far East and was used to great effect in the design of elaborate clockwork.

Eighteenth-century clocks may serve as visible representations of the meeting of East and West: their mechanical technology was Western, but their cases were a mixture of Chinese-inspired and European elements where spiraling pagodas and pigtailed mandarins were combined with twirling pineapples and spinning glass-paste stars to produce pieces that were hybrids of Orient and Occident. European clockmakers attributed their clocks' popularity in China to what they believed was their “Chinese” design. It is unlikely that these makers, who incidentally were creating pieces in the same style for their home markets, were fully aware of the reasons why their pieces were in such demand at the Chinese court. To the Europeans, these pieces were marvelous microcosms of everything that was Chinese.

For the Chinese, clocks were objects of fascination and entertainment. They were regarded as the epitome of European design and technology, and not as objects incorporating a European version of Chinese aesthetics. The appeal lay in the clocks' elaborate cases lavishly decorated with bright enamels, gilding, and an assortment of colored stones, as well as the intricate movements that sounded the hours with bells, music, and animated figures. They were symbols of wealth and status that coincidentally could indicate the time. The Chinese makers, eager to appeal to imperial taste, imitated these chinoiserie-style clocks so they, too, could produce what were to them “European-style” pieces; however, they also added motifs from the Chinese repertoire that made these clocks uniquely Chinese. Although both the European- and Chinese-made clocks were based on the same eighteenth-century Western decorative styles, the resulting pieces show subtle cultural differences.

When examined in conjunction with contemporary texts, these clocks can reveal much not only concerning the transfer of artistic influences between China and Europe, but also on the impressions that the Europeans had of Chinese taste and of the Chinese as a whole. A comparison of the design of elaborate clocks made in Europe for both the Chinese and home markets with those produced by the Chinese for native consumption shows that these clocks are representative of not only the prevailing tastes in Europe and China but also of the European misperceptions of the Far East and how these clocks helped to reinforce these misperceptions. The differences between elaborate clocks made in London, the imperial palace in Beijing, and Guangzhou will be explored by examining the sources of the designs of these clocks, the “Chinese” motifs of the European pieces as a potential boost to these clocks' appeal with the Chinese, the design motifs the Chinese chose to imitate and those they ignored, and the motifs added to the clocks made in China. This examination provides insights into the intercultural blending of styles as well as Chinese court taste in the eighteenth century. Most importantly, the study of these pieces within their social and cultural context allows for a greater understanding of the appropriations, misconceptions, and stereotypes that were connected to the broader problems involved in intercultural contact. This analysis will begin with a brief examination of chinoiserie style in Europe.¹

Europe in the seventeenth and eighteenth centuries witnessed a strong Chinese influence in several cultural areas, most notably in literature, philosophy, and the decorative arts. This taste for the exotic, known as chinoiserie, began in the late seventeenth century and reached its height between 1740 and 1770.² Chinoiserie had very little to do with China per se, but rather reflected an idealized and highly decorative concept of the Far East. The artistic products of this movement have been described as results of the “European imagination [and were] . . . only tangentially based on Chinese designs.”³ Furthermore, the

early chinoiserie of the seventeenth century combined motifs from India and Japan as well as China into one decorative style: it was enough that the style broadly signified the “Orient.” Its fanciful designs affected garden architecture, ceramics, metalwork, interior furnishings, and textiles. So prevalent had such Chinese-inspired elements become that James Cawthorne was prompted to pen in 1771 the satirical poem “On Taste”:

Form'd on his plans, our farms and seats begin
To match the boasted villas of Pekin.
On every hill a spire-crowned temple swells,
Hung round with serpents, and a fringe of bells:
Junks and balons along our waters sail,
With each a gilded cockboat at his tail;
Our choice exotics to the breeze exhale,
Within th' inclosure of a zigzag rail;
In Tartar huts our cows and horses lie,
Our hogs are fattened in an Indian stye,
On ev'ry shelf a Joss divinely stares,
Nymphs laid on chintzes sprawl upon our chairs;
While o'er our cabinets Confucius nods,
'Midst Porcelain elephants, and China gods.⁴

In this work, Cawthorne summarizes the intensity with which Chinese taste had captured the European imagination in the eighteenth century and presents the reader with a variety of images associated with this exotic style. Chinoiserie had penetrated all aspects of English life, from farm buildings to domestic interiors. The “spire-crowned temple” with its “fringe of bells” represented the unusual architectural structures found in China, while the “zigzag rail” was emblematic of chinoiserie’s relative disorder and naturalness when contrasted against more linear and formal native style. Not even farm animals could escape chinoiserie’s influence. The hogs in Cawthorne’s poem are kept in an “Indian stye” and the cows and horses are sheltered in “Tartar huts”; other buildings are designed to “match the boasted villas of Pekin.” As evidenced here, chinoiserie was not exclusively based on Chinese aesthetics but was a mixture of elements from China, Japan, and India; together they approximated the Orient and evoked the unknown “other.” Cawthorne also highlights particular motifs that were considered to be truly Asian and that appear often in chinoiserie designs: the Joss, the figure of Confucius, and the elephant. Cawthorne also points out that this elephant is made of porcelain, a material discovered in China nearly one thousand years before it was made in Europe. As one of the most highly sought trade goods, it was perhaps the single most important item in creating the craze known as chinoiserie.

COLLECTING THE EXOTIC AND THE BEGINNINGS
OF CHINOISERIE

With the discovery and exploration of foreign lands in the fifteenth and sixteenth centuries came the acquisition by the European nobility of what the French naturalist and traveler Pierre Belon (1517–64) referred to as “singularités” and “choses mémorables.”⁵ Items of nature and the arts filled the many cabinets of curiosities that were then becoming fashionable among the wealthy. Among the collectables sought came from the area referred to by the sixteenth and seventeenth-century Europeans as the “Indies” and comprised all the regions east of the Arabian Sea, including China and Japan.⁶ Of particular interest at this time were Chinese porcelains.

The beauty of Chinese porcelain was first made known through the writings of Marco Polo (1254–1323 or 1324), whose colorful descriptions of the Mongol court and the splendors of China published in *The Travels*⁷ greatly increased European interest in Cathay and its products.⁸ Polo was in the service of the Mongol ruler, Kublai Khan, from 1271 to 1292. Of these porcelains he said:

Let me tell you further that in this province, in a city called Tinju, they make bowls of porcelain, large and small, of incomparable beauty. They are made nowhere else except in this city, and from here they are exported all over the world. In the city itself they are so plentiful and cheap that for a Venetian groat you might buy three bowls of such beauty that nothing lovelier could be imagined.⁹

By the fifteenth century, China was producing its most famous ceramic ware: underglaze blue-and-white porcelain that soon became associated in the European mind with the Far East. Porcelain from China (and after 1659, its colored enameled counterpart from Japan) was crucial to the development of chinoiserie style: it introduced new motifs through its designs, created an interest in replicating the clay body, and shaped the taste for Oriental objects in the West. Highly valued, porcelain became a decorative accessory moving from cabinets of curiosities to the walls of “porcelain rooms” in the seventeenth and late eighteenth centuries. One early extant example may be found at Santos Palace in Lisbon, the former residence of Manuel I (r. 1495–1521), where a pyramidal ceiling was added in the second half of the seventeenth century that was lined with Chinese plates and bowls.¹⁰ What were in essence baroque rooms had nearly every conceivable surface covered with porcelain dishes, plates, bowls, and even jars and flasks. While there are many examples of this decorative treatment, two notable examples are the Porcelain Room at

Oranienburg, dating to the late seventeenth century, and that of Charlottenburg, of the early eighteenth century.

The Portuguese were the first to deal directly and exclusively with the Chinese when they held the monopoly on the spice trade in the Indian Ocean in the early sixteenth century and then established a trading post at Macao in 1557. The already high interest in Chinese and Japanese goods that the Portuguese had generated throughout Western Europe encouraged others to enter the China trade. For this purpose, the various nations established their East India companies to facilitate trade with China and were granted permission from the Chinese to establish their factories at the southern Chinese city of Guangzhou in the early seventeenth century.¹¹ The Honourable East India Company of London, known colloquially as “John Company,” was the first to obtain its charter, which was granted in 1600, followed by the Dutch East India Company (*Vereenigde Oost-Indische Compagnie*, or VOC, also known as “*Jan Compagnie*”) in 1602, and the French *Compagnie des Indes Orientales* in 1664. The Dutch were to be the dominant presence in this trade in the seventeenth century, as their naval power allowed them to capture Portuguese car-racks and their cargoes of Chinese porcelains and other goods.¹² Amsterdam became the new trade center for Chinese goods for all of Europe.¹³

As a result of the Western presence in Guangzhou, imports from China to Europe increased dramatically. Porcelain was only one part of the total trade; many other commodities were involved, including tea, which would become a main staple of the British East India Company in the latter part of the eighteenth century.¹⁴ Most of this porcelain was made at the kilns of Jingdezhen in southern China. With the growing demand in Europe, an entire industry devoted to the export trade developed in China. Most decorative themes were undeniably Chinese and consisted of plants such as the peony and bamboo; river landscapes with boats, pavilions, and bridges; beasts, both imaginary and real; and figures of elegant ladies, scholarly gentlemen, or Buddhist and Daoist figures, images that fueled the European imagination and brought about the beginning of chinoiserie.

The overwhelming popularity of expensive Chinese porcelain encouraged makers in Europe to imitate such wares.¹⁵ While the craftsmen could not begin to match the fine clay bodies of Chinese porcelain, they could approximate the shape and decoration of the imported pieces. Tin-glazed earthenware, for example, was painted to imitate the blue-and-white Chinese pieces. To aid in imitating Far Eastern works of art, “how-to” manuals were published with details of technique and a compilation of motifs to yield “successful” results. Often what was to be found in these books was only indirectly Oriental, having been collated from a number of previously published works, and tended to be free interpretations of what the illustrators thought was typ-

ical of life in China. Lacquers from the Far East, for example, were also extremely popular, and one of the best examples of these manuals was George Parker's *A Treatise of Japaning and Varnishing*, published in London in 1688.¹⁶ Included in this work were designs of exotic birds, landscapes, and figures, which were suitable for use in other media (fig. 20). This work was a guide for amateurs, especially for young ladies of the late seventeenth century who would include "japanning" as one of their accomplishments.¹⁷

One popular icon to emerge at this time was the *magot* or *pagod*, a Chinese figure first used by master designer Jean Bérain I (1640–1711), who published his *pagod* in his *Livre de Cheminées* of 1700–1710. Also called pagoda figures, *pagods* were usually depicted as "squatting, round-bellied, open-mouthed orientals made in imitation, or rather, travesty, of Chinese images of Pu-Tai, the god of happiness."¹⁸ Other common motifs in the repertoire of images were the Chinese gentleman with his wide-brimmed straw hat, the Chinese woman in her long robe and holding a parasol, and the pavilion with its upturned eaves.¹⁹ However, these Chinese motifs did not form an ideal pairing with the massive and stately baroque style. The emergence in the 1720s of the lighter-feeling rococo with its characteristic asymmetry allowed chinoiserie to take firm hold.

ROCOCO CHINOISERIE

The transition from the heaviness of the baroque to the fanciful airiness of the rococo was first manifested in France in the change from the large rooms of the seventeenth century to the more intimate salons of the eighteenth. Artists such as Antoine Watteau (1684–1721), who was probably the first to design in the rococo chinoiserie style, created motifs that displayed a "delightful decadence."²⁰ Two of Watteau's grotesques, *L'Empereur Chinois*, and *Divinité Chinoise*, which are perhaps the earliest examples of rococo chinoiserie, were later published as engravings. The influence of Watteau's designs was profound; as Honour writes, "It is no exaggeration to say that they set the pattern and the tone for rococo chinoiserie decorations not only in France but throughout Europe."²¹

Three motifs associated with rococo chinoiserie are the *singerie*, or monkey scenes; the ho-ho bird; and the pineapple. Christophe Huet, inspired by Watteau's fantasies, painted his *grande singerie* in the Château de Chantilly in 1735 with Chinese figures accompanied by monkey attendants. In some places, it is difficult to distinguish man from ape. Bérain probably started this trend when he replaced the fauns in his designs with monkeys. His monkeys, though, were dressed as Parisians; by the 1720s, in keeping with the vogue for Orientalia, the monkeys wore Chinese robes; by the end of the seventeenth

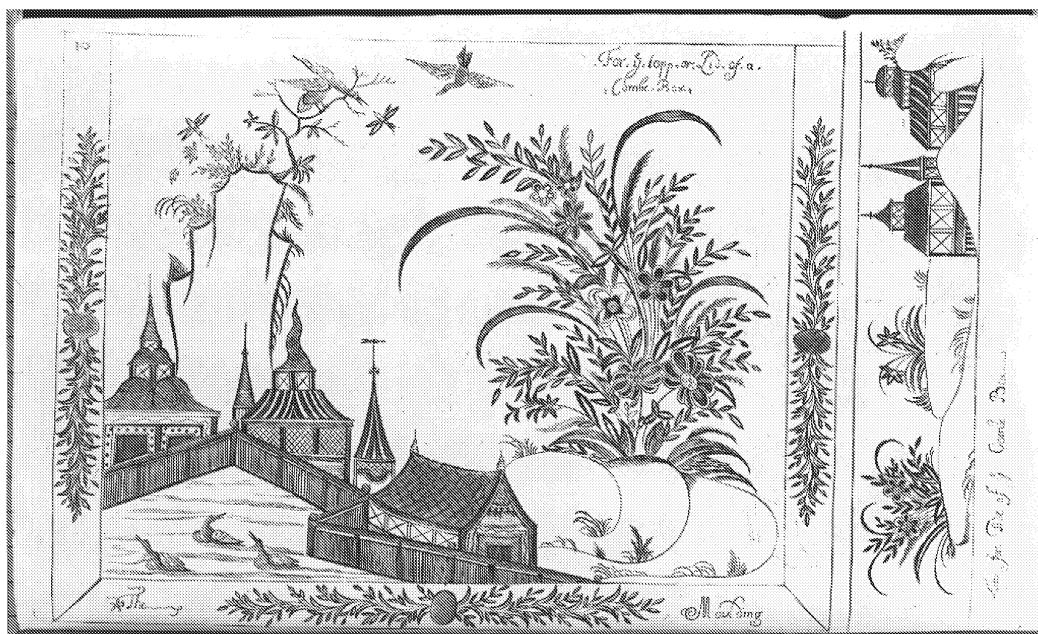


Fig. 20. *Chinoiserie* pattern for the applied arts of the seventeenth century. George Parker, *A Treatise of Japaning and Varnishing* (1688), pl. 3. (Reproduced courtesy of the Royal Ontario Museum.)

century, in the European mind, monkeys were firmly associated with Chinese style.²² The ho-ho bird was especially common in English rococo chinoiserie. The name for this bird comes via the Japanese term *hō-ō* (in Chinese, *fenghuang*), which is conventionally translated as “phoenix,” but is a different mythological bird.²³ A similar motif was found previously in European decorative art of the early sixteenth century.²⁴ The image of the pineapple was likely a carryover from earlier representations from the baroque period that had connected picking pineapples to one of the Chinese emperor’s leisure activities. By this time, the pineapple had become in Europe a symbol for Chinese hospitality,²⁵ although the Chinese did not make use of this image.

Watteau influenced the work of François Boucher (1703–70), who is known primarily for the chinoiserie cartoons he designed for his *tentures chinoises*, a set of tapestries woven at Beauvais in 1742. The six scenes, entitled *The Meal*, *The Fair*, *The Dance*, *Fishing*, *The Hunt*, and *The Toilette*, probably had details taken from sketches by the Jesuit missionary Jean-Denis Attiret (1702–68) that had been sent from China.²⁶ These were very popular and are “in design and detail . . . fully rococo, reflecting the light-hearted attitudes to the Orient of the early eighteenth century, but it is the pomp and circumstance of the East which they celebrate.”²⁷

However, while both Watteau’s and Boucher’s contributions to chinoiserie are undeniable, Jean-Baptiste Pillement (1728–1808) was the best known

of the designers and painters of eighteenth-century chinoiserie. His creations were fanciful, and his work was published in both France and England, thus influencing chinoiseries throughout Europe. Many of his designs appeared in his *A New Book of Chinese Ornament*, published in 1755, *Oeuvre de Fleurs, Ornaments, Cartouches, et Figures et Sujets Chinois* of 1766, and *Cahier des Petits Ornaments et Figures Chinoises* of 1773 (fig. 21). Included in these works were designs that could be applied to silver, ceramics, wallpaper, architecture, and furniture, all with the whimsical asymmetry associated with the rococo.

Eighteenth-century chinoiserie was incorporated into architecture, interiors, and English gardens. In architecture, this decorative style was seen primarily in smaller structures known as *fabriques* or *folies à la chinoise*. These multistoried pagodas and pavilions with bells hanging from their upturned eaves were found in gardens all over Europe.²⁸ Probably the first structure influenced by Chinese design was the Trianon de Porcelaine, built by Louis XIV for Mme de Montespan at Versailles in the years 1670–72, and designed by Louis Le Vau.²⁹ Although said to be *à la chinoise*, the only vaguely Chinese elements about the whole structure were the blue and white faience tiles found on the exterior. These tiles were made in Delft, Lisieux, and the Ange Valley.³⁰ Much admired, the Trianon de Porcelaine inspired many other such buildings that soon dotted Europe.³¹ Associated with this architecture was the Chinese-influenced garden developed in England, owing largely to the work of Sir William Chambers (1726–96) for the duke of Kent at Kew Gardens.³² The publication of plans of structures in these gardens served not only as a model for full-scale buildings, but also as pattern books for interior decorations (fig. 22).³³

There were other charming examples of China-mania found in Europe's pleasure parks. At Monceaux, the duc de Chartres had an unusual and well-known piece in his English garden sometime around 1785. His *jeu de bague*, a kind of merry-go-round, had three Chinese pagods supporting a large parasol that shaded the *jeu*. Four iron rods were attached to the rotating floor, two of which supported dragons upon which the male visitors to the garden would sit, as if on a horse; and the other two terminated in crouching Chinese figures who supported on one arm a cushion on which the ladies would sit. One hand held a smaller cushion for the feet, and the other hand held a parasol hung with little bells. The *jeu* was set in motion by men hidden underground who manually turned the wheels.³⁴

This was part of the love that eighteenth-century European society had for mechanical contrivances, and those in Chinese style were especially popular. At Versailles, Philippe Jacques de Loutherbourg (1740–1812) in 1770 saw an impressive collection of clockwork automata "which performed in an ingenious mixture of light and shadow,"³⁵ similar to the *ombres chinoises* that were seen in France in the late eighteenth century. Cut-outs of Chinese figures were



Fig. 21. Title page, *Cahier des Petits Ornaments et Figures Chinoises*, by Jean-Baptiste Pillement, 1773. Department of Western Art and Culture, Royal Ontario Museum 957.169.10 (Reproduced courtesy of the Royal Ontario Museum.)

shown against an illuminated backdrop. One of these ombres was titled *La Conquête de la Chine*.³⁶

Interiors, including wallpapers, furniture, painted panels, textiles for furnishings, and lighting fixtures were most affected by chinoiserie.³⁷ Toward the end of the baroque period in the late seventeenth century, rooms decorated in Chinese style began to appear in Europe. They offered the perfect means of displaying one's Chinese objects. As was the fashion of the day, chinoiserie ele-

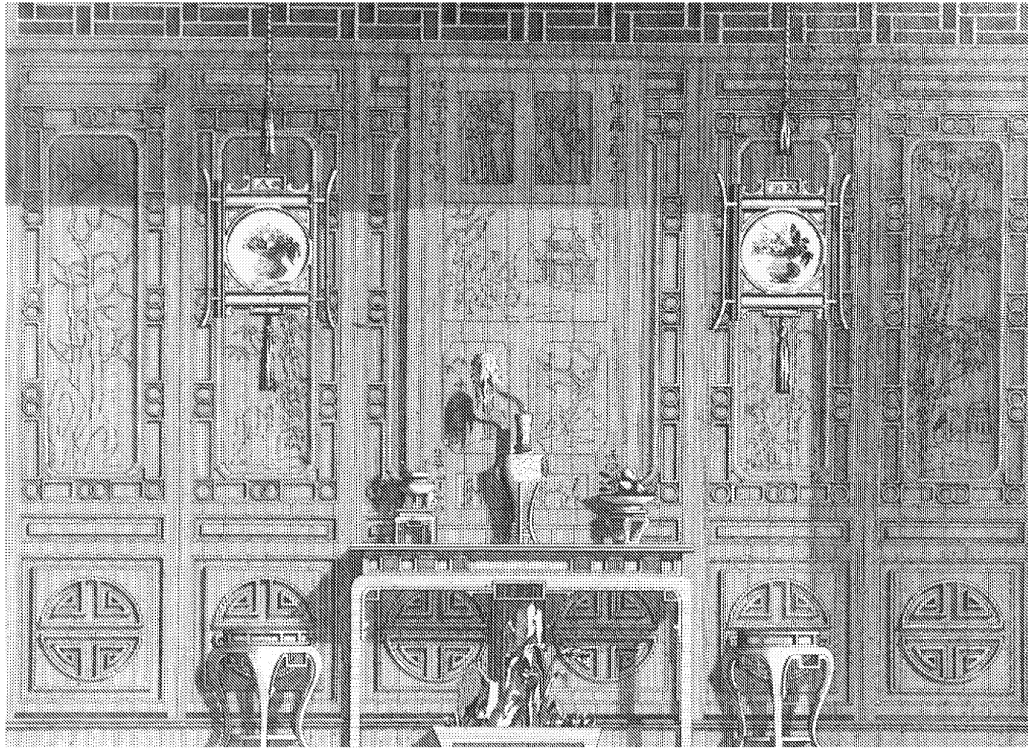


Fig. 22. Interior of Chinese-style room. William Chambers, *Designs of Chinese Buildings, Furniture, Dresses, Machines, and Utensils* (1757), pl. 10.

ments could be used within settings done in other decorative styles, or within rooms decorated entirely in Chinese taste. In order to create the proper atmosphere of exoticism in these rooms, it became popular to inset the walls with painted lacquered panels. Occasionally, authentic Chinese panels were used, but there are many examples throughout Europe where European artists provided imitations. In 1773, Rosalie de Constant, cousin of the French politician and writer Henri Benjamin de Constant de Rebecque (1767–1830), mentioned that the apartments of the duke d'Orléans and duchess de Chartres at the palace at Saint-Cloud were decorated *à la chinoise*. Of particular note were the walls lacquered in yellow and the Chinese-style furniture, all contributing to an air of elegance.³⁸ Based on illustrations found in travel writings on China during this period, or on Chinese designs and embellished by the European imagination, these images were responsible for promoting the stereotypical images associated with chinoiserie. Designers could consult a number of sources such as Edwards and Darly's *New Book of Chinese Designs Calculated to Improve the Present Taste*, and Thomas Chippendale's well-known *Gentleman and Cabinet-Maker's Director* of 1754.

Elaborate clockwork, with or without automatic figures, done in the Chi-

nese style would also have been part of this decorative scheme.³⁹ Although they were usually placed on mantelpieces,⁴⁰ they could be found throughout the room, set against a wall or suspended from the ceiling, in the case of bird-cage clocks that had a clockface on the underside that was visible only when standing underneath the cage.⁴¹

CLOCKWORK AND CHINOISERIE IN EIGHTEENTH-CENTURY CHINA

The Chinese imperial interest in collecting elaborate mechanical clockwork was at its height when chinoiserie was enjoying a certain popularity among fashionable society in Europe. As a result, many of these clocks are made in this so-called Chinese style. The pagodas, dragons, and pigtailed mandarins make reference to the Far East, but the addition of rocailles and leafy swags reveal their European origin at a time when the rococo dominated. Whether constructed in China or Europe, these clocks show a blending of styles characteristic of this period and represent the contact between cultures in the arts. However, the decorative motifs are more than simply evidence of artistic influence; the examination of them and a comparison between the clocks made in Europe with those of China offers an understanding of the broader issues of cross-cultural perceptions and misconceptions.

LONDON

The vast majority of European elaborate clocks associated with eighteenth-century China were the products of London makers. They characterize the light and airy rococo, and of these pieces, most are in chinoiserie style or contain a number of stylistic elements associated with it. Often manufactured in pairs, these clocks were “extravagant compositions”⁴² elaborately decorated with spinning glass-paste stars and flowers, animated figures of humans or animals, painted enamels, and a preponderance of gilt bronze.

James Cox (d. ca. 1791) offers the most complete look into the world of these eighteenth century makers. Not only did Cox produce the largest number of extant signed pieces in the former Chinese imperial collection but he himself discussed his own work in his five surviving catalogs. Such records do not exist for any other clockmaker. His contemporary accounts offer a valuable insight into the full range of his work and his thoughts concerning the source(s) of their design and, more importantly, their overall value. He noted that a few of his creations were made specifically for the Chinese market, while others were in a style similar to or were “companions” to pieces already sent to the Chinese court. Analyzing Cox’s clockwork in conjunction with his discourses provides an understanding of the artistic milieu in which these pieces

were produced not available through artifacts alone: we may see these pieces through Cox's eyes, giving us a unique insight into why his works look the way they do, and how China and Chinese taste were perceived in eighteenth-century Britain.

Cox produced elaborate and costly automaton clocks primarily to show off his skill as a clockmaker and his talents as a designer. He undertook to work in an "Asiatic" mode, he said, in part to appeal to his Chinese clientele. He incorporated into his pieces turbaned Turks, pagodas and pavilions, Chinese figures with umbrellas, and pineapples; all were common motifs in Europe during this period when chinoiserie was still very popular.⁴³ This decorative scheme forms a part of many of his extant pieces as well as clocks described in his catalogs. Cox mentions his inspiration in a catalog of 1772. "Asiatic pomp," he wrote, has been "without taste, without proper effect, and without utility." He endeavored to improve upon it and "conceived the plan of availing himself of the taste of the Orientalists [the Chinese] for brilliancy, by adding to it, design, a higher finishing of the workmanship, and the enchantments of a mechanism, the more likely to captivate people for their having them the charm of the novelty: the whole combined with the sweet harmony of sounds; and even with utility itself."⁴⁴ The results, he claimed, were unique pieces that brought together "Eastern magnificence and European taste and skill."⁴⁵

One typical example of Cox's work in this chinoiserie style is described in an earlier catalog of the same year.

An Automaton in the habit of a Chinese, seated under a Pavillion of avanturine and lapis blue and gold, supported by pillows of silver, the cornish and moulding of the same enriched with gold, on the top of which is a small Temple, containing an Eight-day time-piece, and on each side other elegant Temples, corresponding in richness, elegance and design with the first, and containing musical and mechanical motions, with stars of different magnitude also in motion.

The figure plays various tunes and on a gold flute, ornamented with jewels. The wind proceeding from his mouth, while with his fingers he performs and graces the musick.

The pedestal of this piece, is in form of a commode of the finest lapis lazuli and avanturine, supported by Asiatic beasts, and displays on opening its doors, a most curious piece of machinery of a water mill with a river, bridges, passengers, water falls, cascades, &c. in various directions: behind all which is an organ of excellent workmanship.⁴⁶

These pieces, Cox wrote, took the best elements of Oriental design, his own motifs, and quality craftsmanship and yielded pieces that he considered much

improved. They were “so very extraordinary” that he could find “no words in the whole extent of the english language to do them sufficient justice.”⁴⁷ He denied that his “masterpieces” were “only glittering gewgaws,” for each was able to unite “Magnificence, Taste, Utility, [and] Delight” into one marvelous creation.⁴⁸ However, it is essential to note that the descriptions of the clocks made for sale in Europe did not differ in any significant way from those sent to China.

One of the “most successful extravagances that ever came from Cox’s workshop”⁴⁹ and one that shows how Cox had availed himself “of the taste of the Orientalists for brilliancy” is an elaborate timepiece, dated to 1770, now in the collection of the Palace Museum, Beijing (fig. 23). Made of gilt bronze, this clock consists of a large elephant supporting upon his back a waterfall made of fluted rotating glass rods. Pots of jeweled flowers are placed at each corner of the base of the waterfall. Above the waterfall is a clockface topped by a vase of glass-paste flowers. A jeweled dragon flies above. Rocailles surround the clockface, and the waterfall is framed by four cloven-hoofed legs capped by grotesque faces. The elaborate pedestal of gilt bronze hunting scenes rests on the backs of four gilt bronze lions. Standing atop each lion’s back is a figure of a Turk (or an Indian) holding a bouquet of glass-paste flowers. Harcourt-Smith’s description in 1933 tells of both the hunting scenes and rocks for the waterfall set against green lacquer backgrounds; since that time, however, this clock has been subjected to rather heavy overpainting of the lacquer. Each hunting scene is framed by a jagged-rock border that, too, has fallen victim to overpainting in brown. One of a pair, its mate has also suffered from similar “restoration” measures. Music accompanies the animation of the various elements.

In this piece, Cox has used elements associated in the European mind with Asia: the turbaned figures of Turkey or India, the elephant, and the dragon, and added to them his own “enchancements.” The gilt bronze lions, the glass waterfall, and the twirling vases of flowers are designed to improve upon Oriental brilliancy, yield “proper effect,” and improve upon taste, and all of it “combined with the sweet harmony of sounds.” With its overwhelming exuberance of “Chinese” motifs and European fantasy, this clock truly characterizes English elaborate clockwork of the late eighteenth century.

Where did Cox and his contemporaries find the “Oriental” elements he incorporated into his clocks? European clockmakers could turn to a number of different sources for inspiration for their Chinese designs. Chinese objects, especially the painted porcelains imported as a result of the activities of the East India companies, provided new stimulus in the arts, though, ironically, these seem to have been least important in influencing design. These motifs, perhaps, were not seen as sufficiently exotic on their own and thus were enhanced by the European designer’s imagination in order to meet public expectation.

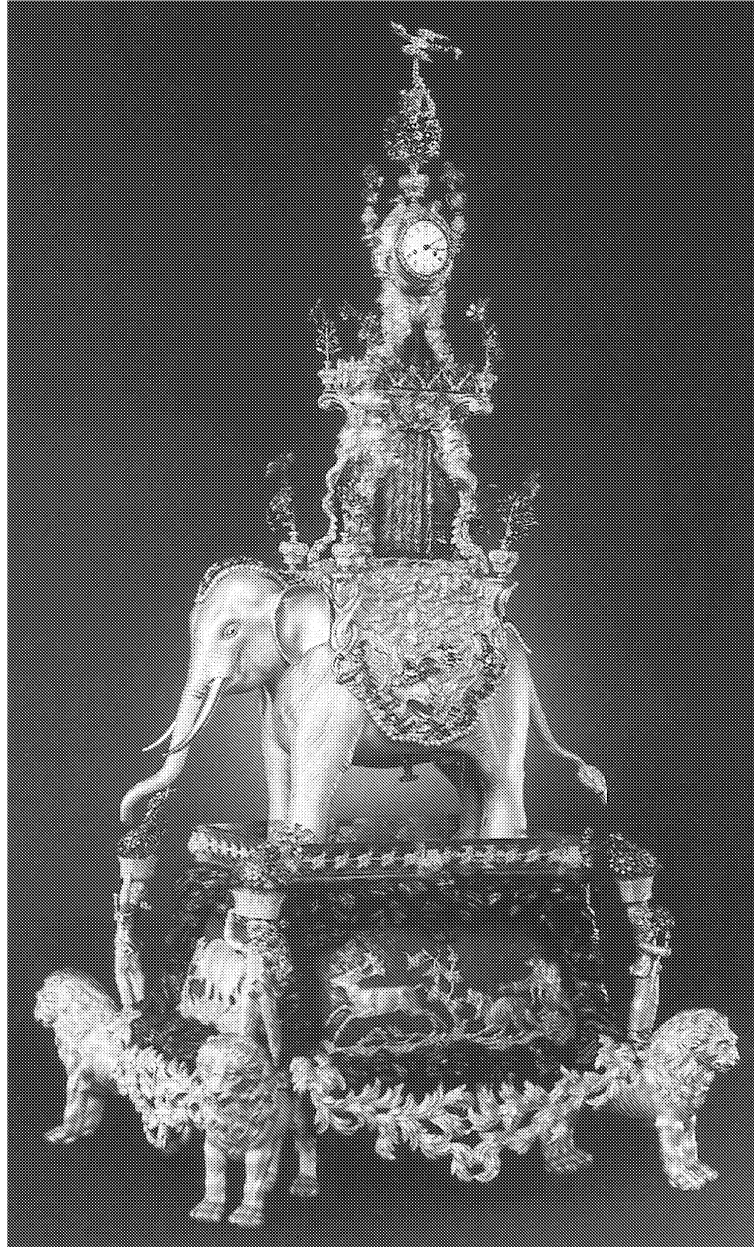


Fig. 23. Gilt bronze clock in the form of an elephant with a waterfall, James Cox, ca. 1770. Height 86 cm. Palace Museum, Beijing.

Of great inspiration were sets of so-called Chinese engravings by European artists including those by the master of chinoiserie, Jean-Baptiste Pillement, whose fanciful designs appeared in his many publications, and how-to manuals by European designers for use by both craftsmen and amateurs. Imaginative and only loosely based on fact, these images provide the foundation for the profusion of elements found in chinoiserie. Among these is the ubiq-

uitous mustachioed mandarin with the floppy broad-brimmed hat common to many examples of chinoiserie, an example of which may be found on a gilt bronze clock of 1758 by William Shutter, now in Beijing (fig. 24). Such images may be traced to early impressions of China, dating to the seventeenth century (fig. 25).

Illustrated European writings on China were also tremendously influential. The most widely read of these were Jan Nieuwhof's *L'Ambassade de la Compagnie Orientale des Provinces Unies vers l'Empereur de la Chine* of 1665, which chronicled the Dutch embassy to China under Peter de Goyer and Jacob de Keyser, and Athanasius Kircher's (1602–80) *China Monumentis . . . Illustrata* of 1667.⁵⁰ These works were consulted as design sources well into the eighteenth century.

Exotic architectural structures that appeared in these works, such as the single and multistoried pagoda, caught the Western imagination (fig. 26). They seemed to be most evocative of the East and were combined with other elements in chinoiserie designs to create a uniquely European vision of China. Particular attention was given to the curved eaves of the roofs, which often had the embellishment of bells hung from each corner. The tall pagoda and the unusual pavilion fit well in the fashionable Anglo-Chinese gardens, and a number of writers and architects of the eighteenth century published plans and elevations for these structures. The earliest chinoiserie building in England was the “House of Confucius” at Kew, erected in the 1740s, and no longer standing (fig. 27).⁵¹ By 1753, Horace Walpole wrote that “there are several paltry Chinese buildings and bridges [at Wroxton] which have the merit or demerit of being the progenitors of a very numerous race all over the kingdom.”⁵² One of the most influential architects was Chambers, who published his *Designs of Chinese Buildings, Furniture, Dresses, Machines, and Utensils* in 1757.⁵³ The popularity of this work led to his commission to design at Kew a Chinese pavilion, no longer extant, and the Great Pagoda, with ten stories and dragons at the eaves, built in 1761–62 (fig. 28).

Probably because of their great height, multistoried pagodas were of particular interest to eighteenth-century Europeans, and this architectural form appeared in a range of scales, from full-size garden buildings to table-top models. As decorative items, the models were made of a variety of materials, and although common during the period, few are extant owing to their fragile nature. There are three nine-storied pagoda models in the collection housed in the Chinese Pavilion at Drottningholm, Sweden: one, of bamboo and covered with colored glass beads and feathers, is mentioned in the inventories of 1719; the other two are a pair made of ivory and mother-of-pearl, and noted in the inventories of 1739. Common to all are the bells hanging from the corners of each roof.⁵⁴

Found in the design books by Chambers, the illustrated works of Kircher



Fig. 24. Gilt bronze musical clock with chinoiserie figures, William Shutter, dated 1758. Height 40 cm. Palace Museum, Beijing.

and Nieuhof, and Anglo-Chinese gardens, the pagoda shape even found its way into the design of clocks of the period. This striking form could be found as a single-roofed structure or as a multistoried building, and while popular on the English-made clocks, the pagoda could be found on Chinese-made clocks as well. A pair of clocks by Timothy Williamson datable to around 1780 provided much entertainment through the clever use of mechanisms (fig. 29). Each piece is in the form of a two-storied pagoda with palm tree supports set



Fig. 25. “Sineesche paapen: Prestres ou Moines Chinois.” Jan Nieuhof, *L’Ambassade de la Compagnie Orientale des Provinces* (1665). (Courtesy of Gardiner Museum of Ceramic Art, Toronto.)

atop a large enameled base, also in the form of a pagoda. Bells are suspended from the eaves of the roofs by dragon heads. At the appropriate time, exotic animals march around a glass-rod waterfall in the center of the uppermost pagoda. A clockface and two other dials are set into the base. In a second example by an unknown European maker, datable circa 1770, the composition is reminiscent of Pillement’s rococo chinoiserie (fig. 30). A turbaned figure plays a set of bells under a canopy with corners terminating in dragon heads, from whose mouths are suspended bells on chains. The canopy supports are held by four Asian figures identified by their exotic costume.

The multistoried form of the pagoda also offered the clockmakers the opportunity to showcase their skills through imaginative and unusual mechanisms. One pair of musical clocks in the form of a pagoda, datable circa 1780, has spinning rooftops hung with bells, and about the base figures appear and march around (fig. 31). The pagoda also telescopes by compressing and expanding, returning to its full height when the music ends. Bells were a common feature of the chinoiserie roof and were in some cases suspended from dragon heads placed at each corner, as seen in a mechanical clock of circa 1775 (fig. 32), a feature similar to Chambers’s pagodas and pavilions for English gardens (fig. 28).

While most of the “Chinese” designs were of European origin, a small

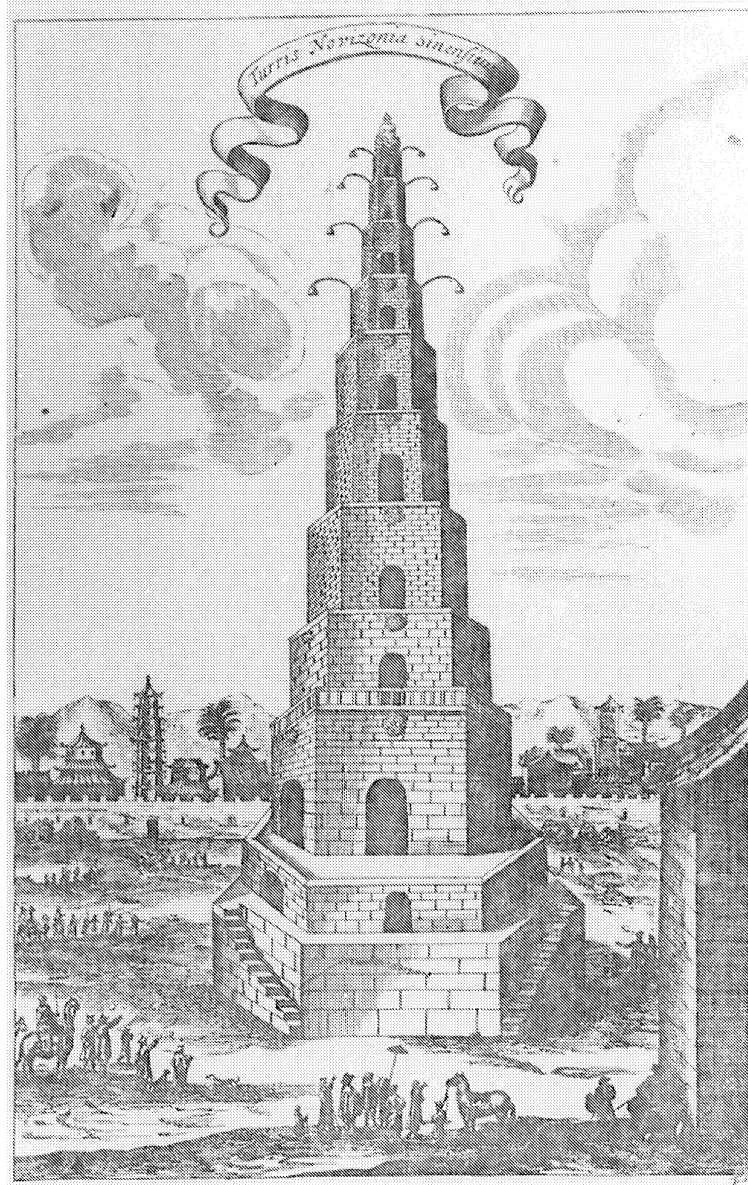


Fig. 26. “Turris Novizonia Sinensium.” Athanasius Kircher, *China Monumentis . . . Illustrata* (1667), between pp. 134 and 135.

number of the shapes and motifs that were used in fashioning clocks appear to come from the Chinese pieces imported into Europe during the eighteenth century. One such example was the “half-vase” or “wall vase” clock (*huaping*, flower vase), which took as its outline the shape of a Chinese vase. In this case the vase was flat, with only one side decorated. The clockface was usually positioned in the lower half of the vase. Clocks in this form were to be mounted on a wall, or in China perhaps inside a sedan chair.⁵⁵ There are several such half-vases still in the imperial collection, including one by G. Duck, of London,

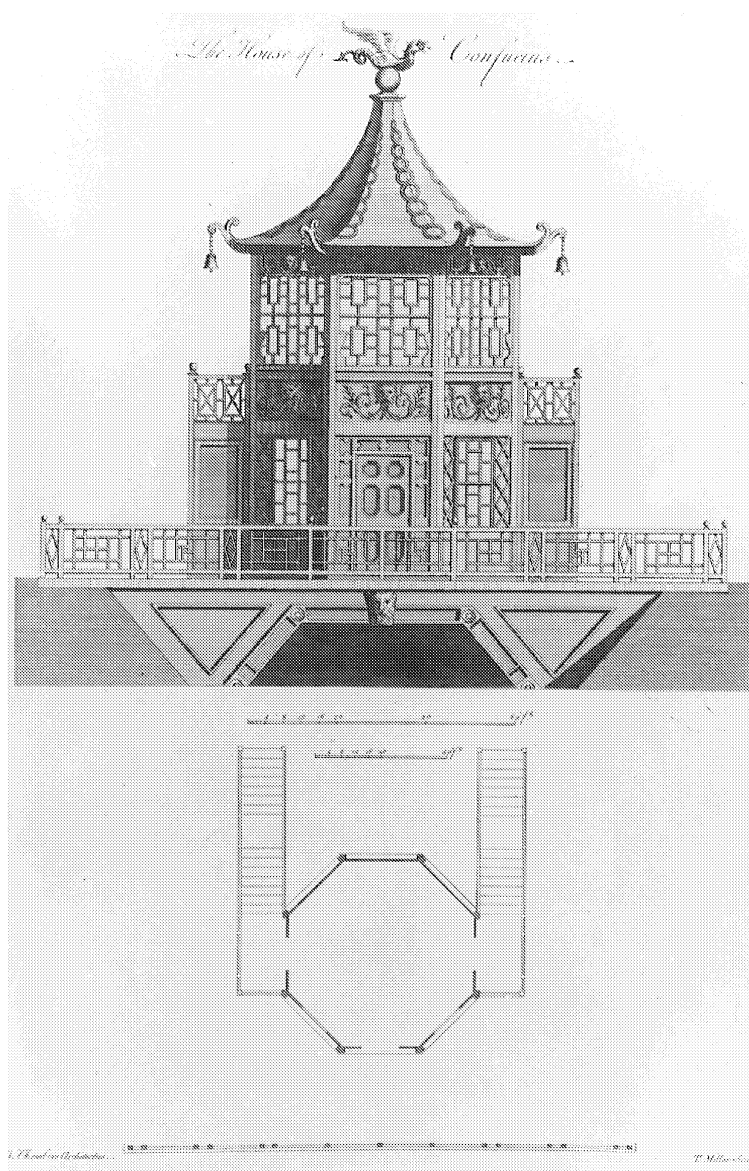


Fig. 27. “The House of Confucius.” William Chambers, *Plans, Elevations, Sections, and Perspective Views of the Gardens and Buildings at Kew in Surry* (1763), pl. 15.

which has its central portion decorated in painted enamels with two turbaned chinoiserie figures striking a painted bell; one by Daniel Quare where the two turbaned figures appear to support the clockface (fig. 33); one by John Halstead, of London; and one by Thomas Rayment.⁵⁶

Not all of the clocks produced in Europe in the late eighteenth century were in chinoiserie style. Although this aesthetic movement was still popular, China itself was falling out of favor in the West. Increased contact in the Far

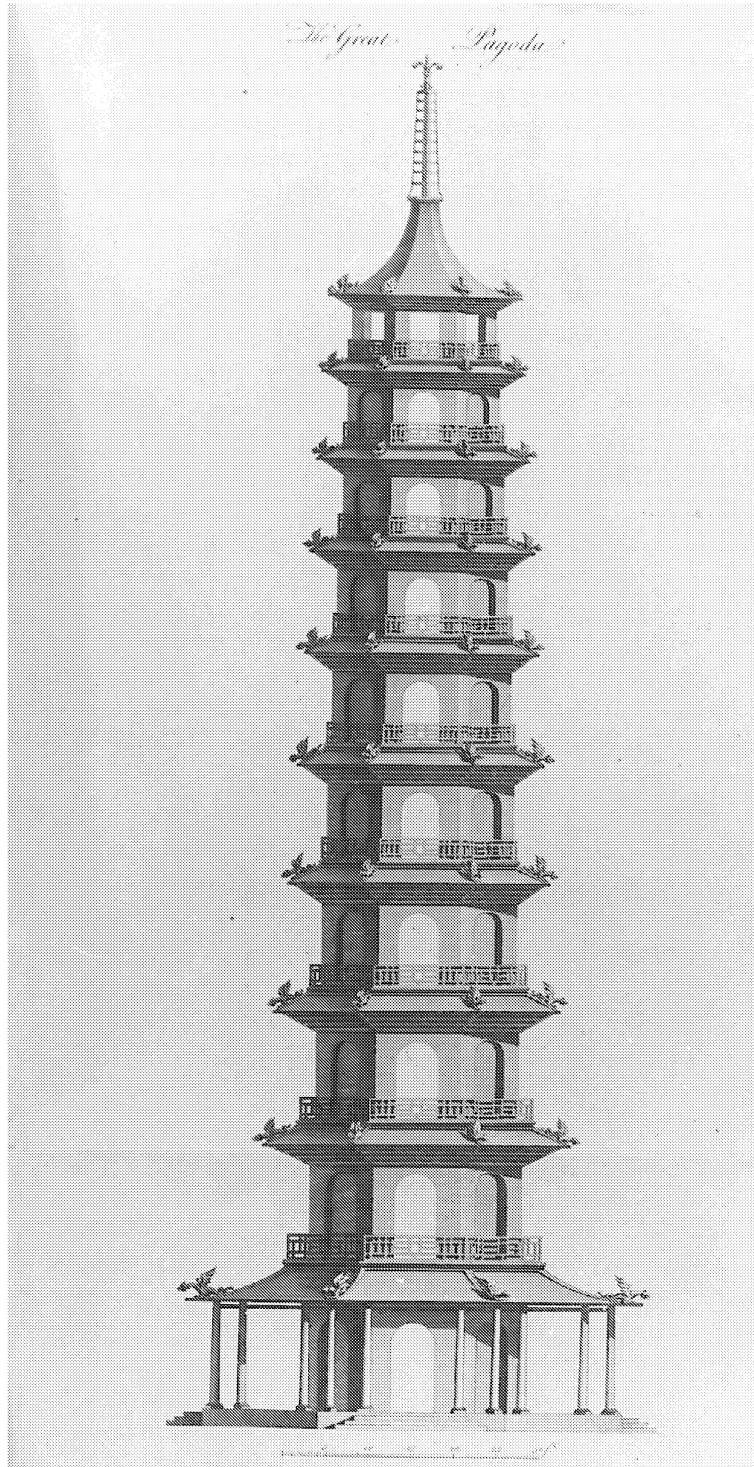


Fig. 28. "Elevation of The Great Pagoda, as First Intended."
William Chambers, *Plans, Elevations, Sections, and Perspective
Views of the Gardens and Buildings at Kew in Surry* (1763), pl. 5.



Fig. 29. Gilt bronze musical clock in the form of a two-story pagoda, Timothy Williamson, ca. 1775. Height 77 cm. Palace Museum, Beijing.

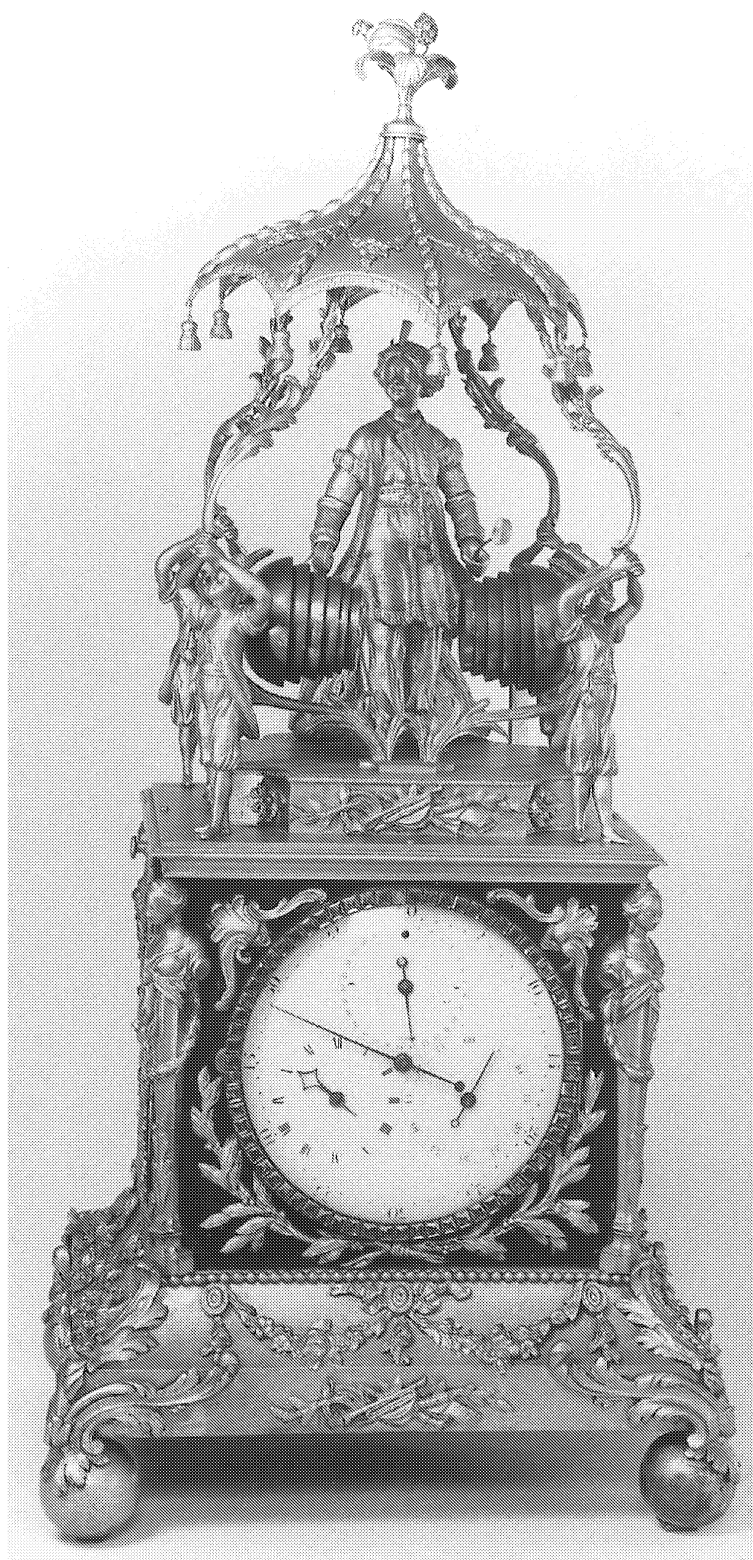


Fig. 30. Gilt bronze clock in the form of a pagoda with turbaned figure playing bells, an unknown English maker, ca. 1770. Height 83 cm. Palace Museum, Beijing.



Fig. 31. Gilt bronze musical clock in the form of a five-tiered pagoda, unknown English maker, ca. 1780. Height 97 cm. Palace Museum, Beijing.

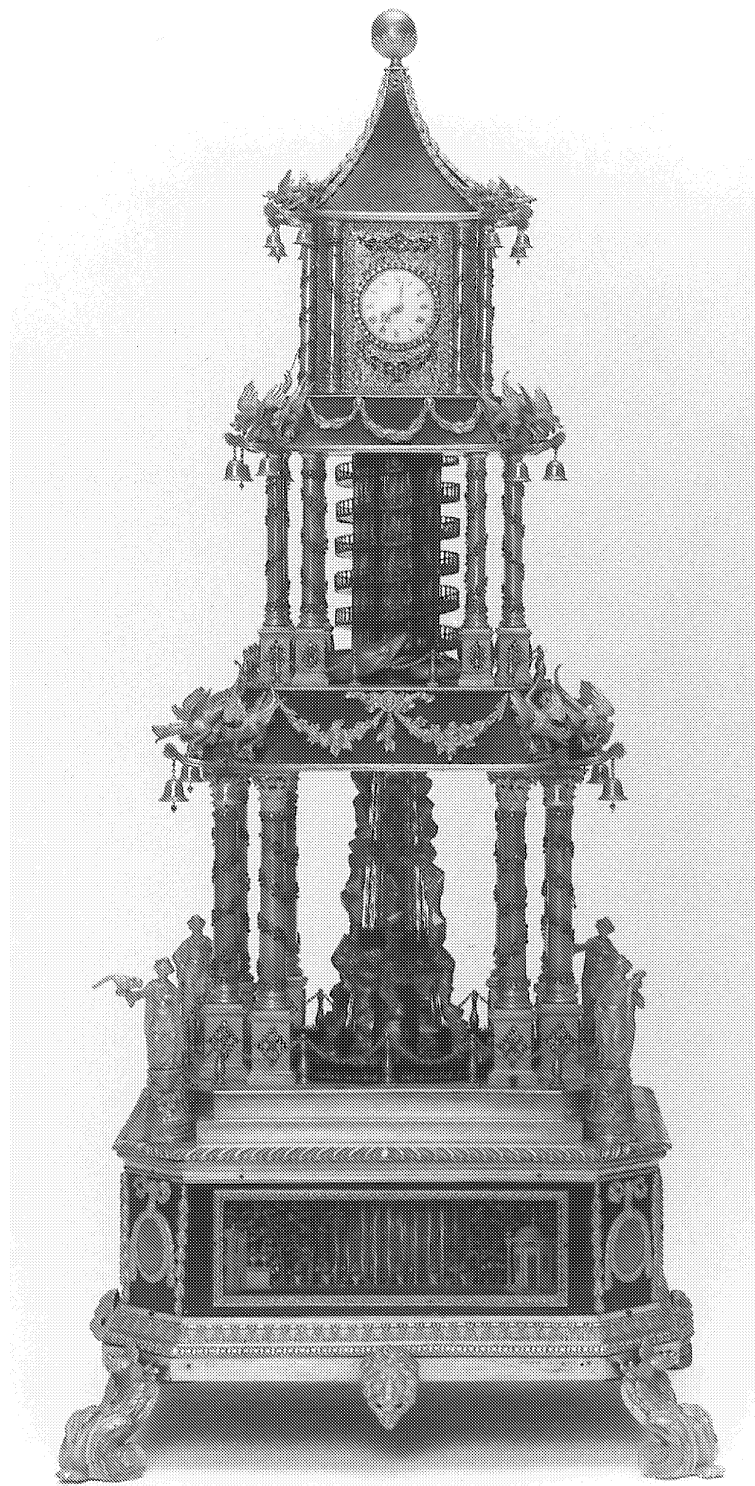


Fig. 32. Gilt bronze musical clock in the form of a three-tiered pagoda, unknown English maker, ca. 1770. Height 123 cm. Palace Museum, Beijing.



Fig. 33. Clock in the form of a wall vase, Daniel Quare, eighteenth century. Height 43 cm. Palace Museum, Beijing.

East in the second half of the eighteenth century brought many firsthand accounts of the country, often less than complimentary. From the 1750s, chinoiserie was the target of some rather biting sarcasm. One English writer believed that “so excessive [has] the love of Chinese architecture become, that at present the foxhunters would be sorry to break a leg in pursuing their sport over a gate that was not made in the Eastern fashion of bits of wood standing in all directions.”⁵⁷

This was a change from the high regard that the Europeans had had for China. It was probably this increased criticism that prompted Cox to justify his use of Asiatic motifs, including the “barbaric cast of [Chinese] taste and customs”:

A curious spectator may find here wherewith to satisfy himself, in considering the difference between the European and Asiatic tastes. This is even a preliminary distinction of which it is necessary not to lose sight. These pieces of work having been originally designed for the Orientalists; it is but natural that a certain conformity should have been retained to the barbaric cast of their taste and customs; a conformity which is so far from hurting the objects presented, that it rather gives them a poignant and constructive variety. He must be little acquainted with the nature of things, that would judge of these pieces, which were calculated for the Indian and Chinese markets, by the austere rules of European Arts. Who does not know that our modern gardens owe their greatest beauties to nothing but the courage of adopting, from the Chinese, their just disdain of enslavement to the fetters of Art; to the tame laying out of compartments, with all their sad and frigid symmetry? The wildness of the Oriental models have a right to please, not only in quality of exotic, but in their giving that kind of idea of infinity, which arises from an irregularity or disorder, that even while, in some respects, it deviates from nature, imitates her, at least, in her spirited licences, and bold strokes.⁵⁸

By the third quarter of the eighteenth century, the gothic revival and neo-classic movements were beginning. Archaeological discoveries at Pompeii and Herculaneum in 1755 had brought new stylistic influences to notice, and by 1780, the neoclassical had all but superseded the rococo. This was not just the result of an interest in the antique, but in the case of neoclassicism particularly, it was largely owing to a growing distaste for chinoiserie and a desire for a completely dissimilar style. The calm, restrained forms of the neoclassical offered a perfect contrast to the asymmetry and frivolity of chinoiserie. Often the neoclassical was combined with other elements, as seen in one clock made in London and datable to around 1780–90, which shows neoclassical and Gothic forms (fig. 34). Concerning this piece, Harcourt-Smith writes: “The



Fig. 34. Gilt bronze musical clock, John Marriott and Lewis Pantin (movement signed "Marriott" and case signed "Lewis Pantin Fec. London"), dated 1781. Height 81 cm. Palace

composition of this piece, which seems to have derived its inspiration equally from the Pompeiian discoveries, Montgolfier's ascents [ballooning, from which the clock's balloon-shaped case derives], and the 'Castle of Otranto' [the gothic novel by Horace Walpole], is more remarkable than successful.”⁵⁹

CHINA

Such European clocks served as the models for those the Chinese were making for their own market in the eighteenth century. This native industry developed in response to the need to maintain and repair existing European pieces, as well as to manufacture new ones to keep up with the demand. The Chinese learned the European skills associated with both the technical and decorative aspects of clock making at the hands of Jesuit makers and by imitating imported pieces. Just as the Europeans had wanted to be able to imitate Chinese lacquers and porcelains, the Chinese, too, were eager to learn the skills needed to produce these clocks. The overall form of the Chinese clocks was European, and it was then embellished with all manner of designs, including chinoiserie pagodas and bells; rococo rocailles; neoclassical urns, columns, and leafy swags; and a profusion of auspicious Chinese symbols. As Mathieu Planchon wrote in the late nineteenth century, “The appearance of a Chinese clock shocks the eye, firstly, by the mixture that one encounters of Chinese and European elements.”⁶⁰

European aesthetics were promoted at the Chinese court, largely owing to the Jesuit presence there. The Kangxi (r. 1662–1722), Yongzheng (r. 1723–35), and Qianlong (r. 1736–95) emperors were admirers of European art, and enjoyed collecting a variety of items given to them as gifts from the various courts of Europe. In order to have a continual supply of Western-style goods, they allowed a number of Jesuit missionaries at court to paint, engrave, or fashion whatever the emperor saw fit.⁶¹ Outside the court, the impact of European taste was seen in art for export owing to the great demand in Europe for goods made in China that imitated Western items, following the dictates of European clientele. In producing items that often were required to have specific shapes or motifs, the many Chinese craftsmen and painters who worked primarily in Guangzhou were in direct contact with European pieces or drawings, unlike the small closed circle of court painters and artisans who came to know the Jesuits' work. In fact, George Chinnery (1774–1820), the English painter of the early nineteenth century who lived for many years in Macao, had a greater following and probably had more of an impact on Chinese painting through his commercial studio than had the Jesuits through all of their high-level connections at court. The number of students in south China and Hong Kong who studied under Chinnery and painted in his style, much of it for the export market, is impressive.⁶² Thus, while the overall aesthetic principles including perspective and shading of European painting may

not have appealed to orthodox Chinese artists, European art did introduce new technologies and materials to the Chinese that ultimately had a long-lasting effect.

Chinese imperial interest in Western art and science reached its height under the Qianlong emperor in the eighteenth century. This extended to the creation of the series of European palaces in a pseudo-rococo style built within the grounds of the Changchunyuan. These palaces must have been a marvelous sight. The Jesuit Jean-Denis Attiret described this “Versailles of China” to M. Assaut in a letter of November 1, 1743:

The palace is at least as large as that at Dijon. . . . In general, it consists of a large quantity of dwellings detached from one another, but in fine symmetry and separated by vast courts, gardens, and flower beds. The façade of all of the buildings is brilliant from the gilding, glazing, and, painting. The interior is trimmed and furnished in all that is most beautiful and most precious from China, the Indies, and Europe.

As for the pleasure palaces, they are charming.⁶³

These palaces housed many of the European items sent as gifts from the courts of Louis XIV and XV, including clocks, tapestries, and paintings. They were also the site of activities following European customs, including an Italian light opera, which was performed by the Jesuits. The famous concubine Xiangfei had her portrait painted there while costumed *en paysanne*, perhaps in imitation of Marie Antoinette.⁶⁴ In this painting, she looks remarkably similar to a figure in one of Boucher’s paintings of 1742, entitled *Chinese Fishing Party*, which served as a model for his *tentures chinoises*.⁶⁵ Xiangfei also sat for a second portrait while dressed in European armor.⁶⁶

The Chinese-made clocks that made their way into the imperial collection in the eighteenth century came from two main centers of manufacture: the palace workshops in Beijing and the city of Guangzhou. Suzhou did not emerge as an active center until the nineteenth century, and few examples of Suzhou clocks are found in the imperial collection. The clocks may be described as cross-cultural hybrids, utilizing motifs from both the European and Chinese repertoires, and generally have faces with Arabic or Roman numerals or both. However, the products from each area have their own distinctive characteristics, and it is the degree to which they assimilated European arts that distinguishes them. They are able to tell us about Chinese imperial taste, the nature of the clock-making industry in China, and the level of European influence in this craft. For Chinese clockwork, the same kinds of documentary evidence as are available on the London maker Cox do not exist, but the large number of artifacts speaks eloquently for their makers.

GUANGZHOU CLOCKS

Guangzhou was an important clock-making center, and most of the Chinese-made clocks in the former imperial collection were produced here.⁶⁷ Located in southern China, Guangzhou served as a main point of contact for foreign trade. As a result, the craftsmen there had access to foreign clocks and watches that they used as models for the pieces they created. They were struck by the colored glass stones and the twirling bouquets of flowers of the European clocks and by the use of gilt metal in the forms of swags, rocailles, and blind frets. Guangzhou clocks, therefore, show greater similarity to the European clocks; however, they are distinguished from their European counterparts by their lavish use of painted enamels and the addition of distinctly Chinese motifs. While both the Guangzhou clocks and those produced in the palace made use of painted enamels, the Guangzhou clocks in general use blue as the dominant color. The flowers themselves are much smaller and connected by vine scrolls, and each is of a single color.

One very elaborate example that reflects this merging of European and Chinese aesthetics is a clock made in Guangzhou in the eighteenth century to celebrate the emperor's seventieth birthday in 1780 (fig. 35).⁶⁸ On the uppermost level is a *qilin*, a benevolent imaginary beast, which supports a large clock on his back.⁶⁹ The elaborate pedestal on which he stands contains small mechanical figures of monkeys dressed in European costume (an interesting contrast to Huet's *singeries* and complementary to those of Bérain) and carrying peaches. This is an allusion to an episode in the *Xiyou ji* (Journey to the West) in which the monkey Sun Wukong disrupts the Festival of the Peaches of Immortality.⁷⁰ At each of the four corners of this pedestal are European-style vases with palm trees surmounted by jeweled pineapples.

Perhaps the most interesting of these hybrids are the elaborate clocks that have the clockface set into the lower half of a large gourd or calabash, *hulu*. The gourd is often decorated with Chinese symbols for long life and is itself symbolic of longevity. It is the attribute for the crippled beggar Li Tieguai, one of the Eight Daoist Immortals, who is depicted in visual art as holding a bottle gourd with curling vapor emanating from it, representing the ability of his soul to leave his body and travel to the world of the immortals.⁷¹ Williams, citing Justus Doolittle's *Social Life of the Chinese of 1868*, reports that the gourd, or a replica of one, painted on paper, cut from paper, or carved from wood, is used "as a charm to dissipate or ward off pernicious influences."⁷² One eighteenth-century clock of Cantonese manufacture in this form is in the collection of the Palace Museum, Beijing (fig. 36). Placed on the top half of the gourd vase is a sun at the center of which is a *yinyang* made of yellow and red glass-paste stones. The pedestal of the clock has a small mechanical monkey holding a peach while standing under a miniature peach tree, and two spotted



Fig. 35. Clock of gilt bronze made for the birthday of the Qian-long emperor (birthday not specified). Height 97 cm. Guangzhou, eighteenth century. Palace Museum, Beijing.

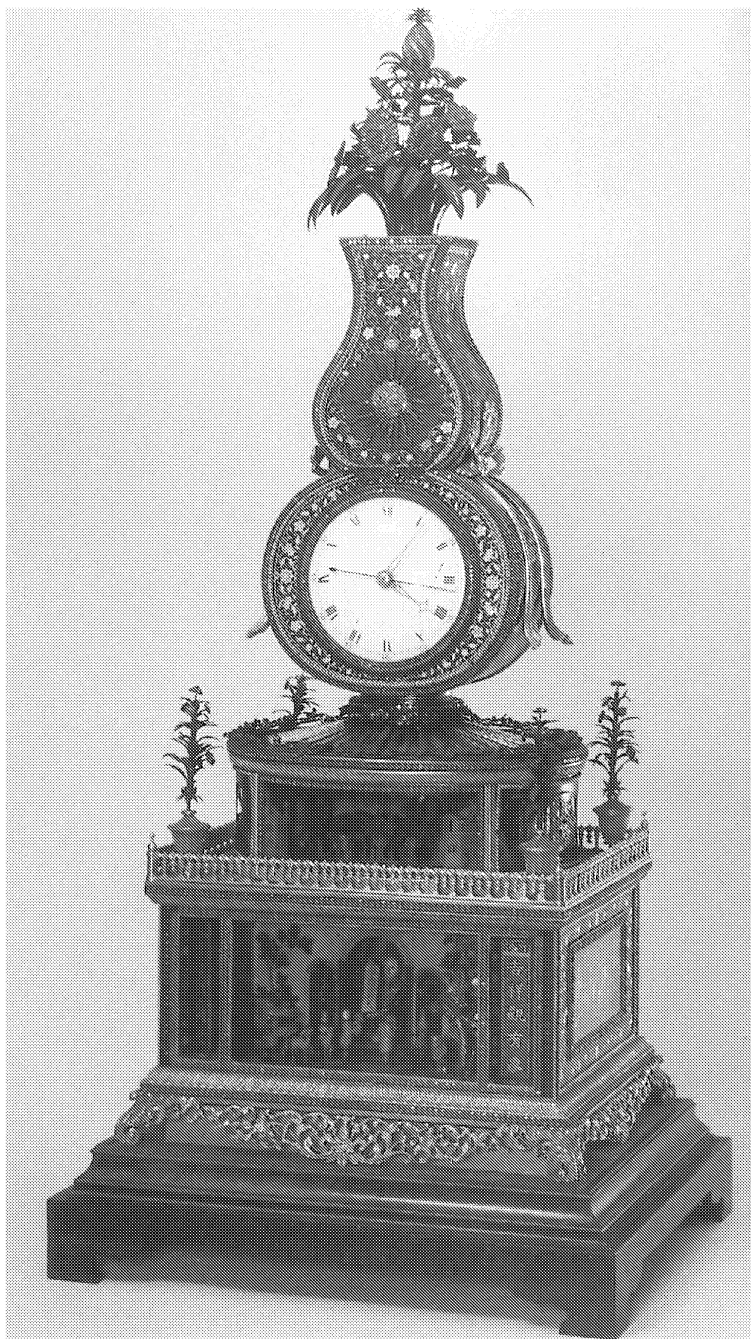


Fig. 36. Enameled clock in the form of a double gourd. Height 112 cm. Guangzhou, Qianlong period. Palace Museum, Beijing.

deer next to a large fungus of immortality, *lingzhi*, both symbolizing longevity.⁷³ At the center sits a large figure holding a banner with wishes for happiness and prosperity. On either side of this scene is a set of couplets, both of which rotate when the music is played. The gilt metal balustrade and elaborate scrollwork ornaments, the brightly painted enamel flowers on the gourd, and the jeweled flowers surmounted by a large jeweled pineapple that emerge from the top of the vase are clearly European in style.

A second example, also made in Guangzhou, is a large musical clock in the form of a two-tiered structure topped by a large double gourd in blue enamel (fig. 37). The upper bulb of the gourd is embellished with variations of the character for long life, and the lower bulb has the characters *daji*, “great good fortune,” in faceted red glass-paste stones. The combination of the gourd shape and the Chinese characters *daji* are found on other contemporary pieces, including a painted enamel vase given by Guangzhou officials to the Chinese court.⁷⁴

The Cantonese makers also made use of architectural forms found on the European clocks and thus were making their own copies of European interpretations of Chinese structures. There are a number of examples where the pavilion is vaguely Chinese: upturned eaves terminating in dragon heads holding small bells in their mouths. Various kinds of items may be inside these pavilions, from figures and potted plants to painted spools that slowly turn, creating the effect of a scene unfolding. One of the more exuberant examples of this theme in Guangzhou clock making is an elaborate creation of gilt bronze, extensively enameled in blue with small flowers of various colors and comprised of three levels (fig. 38). The upper level represents an elaborate pavilion, the walls and roof of which are enameled. Inside the arched doorway outlined in red glass-paste stones is a moving-picture spool. The second tier contains a prominent clockface; at each corner of this level are potted plants in gilt bronze vases; and the rectangular base of enamels and a profusion of glass-paste stones contains a landscape through which move the painted images of a man and donkey. The whole is capped by a large “glory”: an spinning roundel inset with a profusion of colored stones. Apart from the enamel work, this piece could pass for a European clock.

A second example depicts a seven-storied gilt bronze pagoda atop a rectangular base containing the clockface (fig. 39). Its upturned eaves are hung with bells and in the arched doorway of each story is the image of an immortal. Each story has eight corners. While this clock is of less exaggerated form than the previous example, it shows a strong European influence. A similar piece made in London of a multistoried pagoda contains much of the same elements; here, however, the roof of each story is embellished with blue and white glass stones (fig. 40).

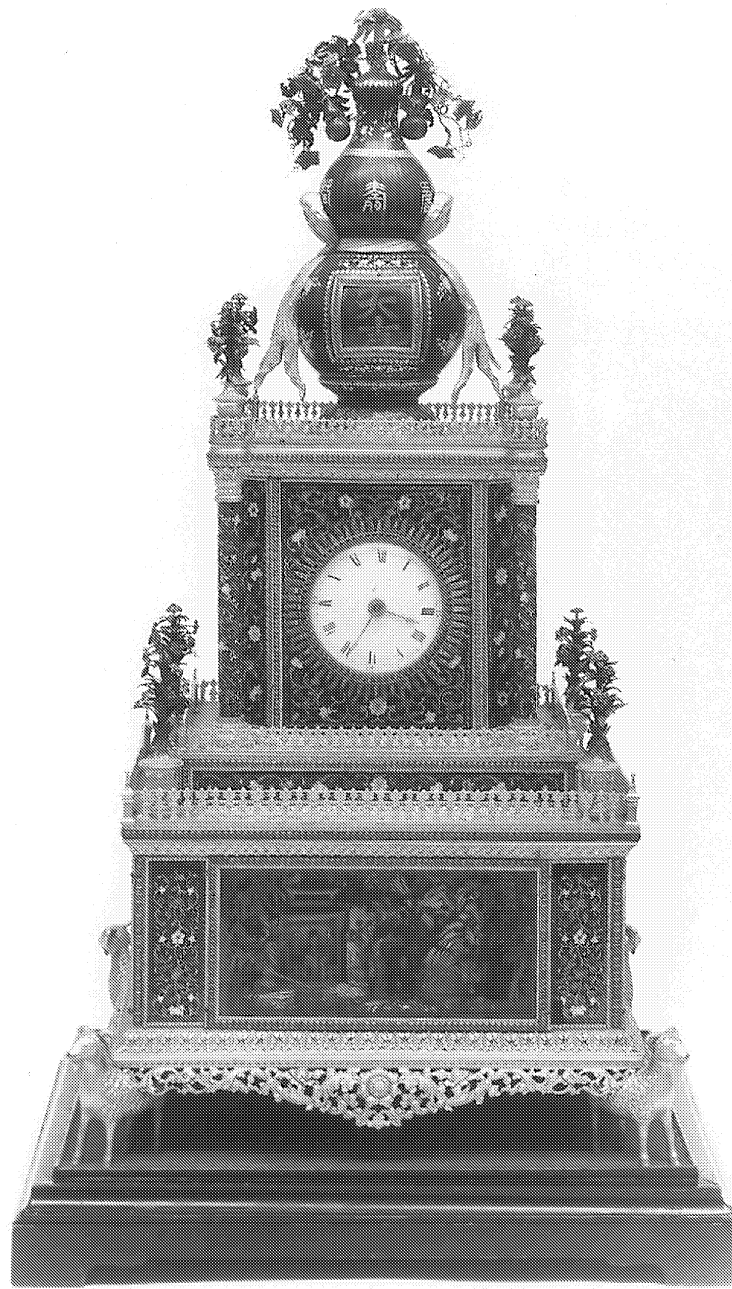


Fig. 37. Gilt bronze and enamel clock in the form of a two-tiered structure surmounted by a double gourd. Height 94 cm. Guangzhou, Qianlong period. Palace Museum, Beijing.

PALACE WORKSHOPS

Established in the late seventeenth century under the Kangxi emperor and staffed by Jesuit missionaries and Chinese craftsmen, the palace clock-making workshop, Zuozhongchu, produced clocks and watches for imperial consumption. While the European influence is unmistakable and dominates the



Fig. 38. Gilt bronze and enamel musical clock. Height 83 cm.
Guangzhou, Qianlong period. Palace Museum, Beijing.

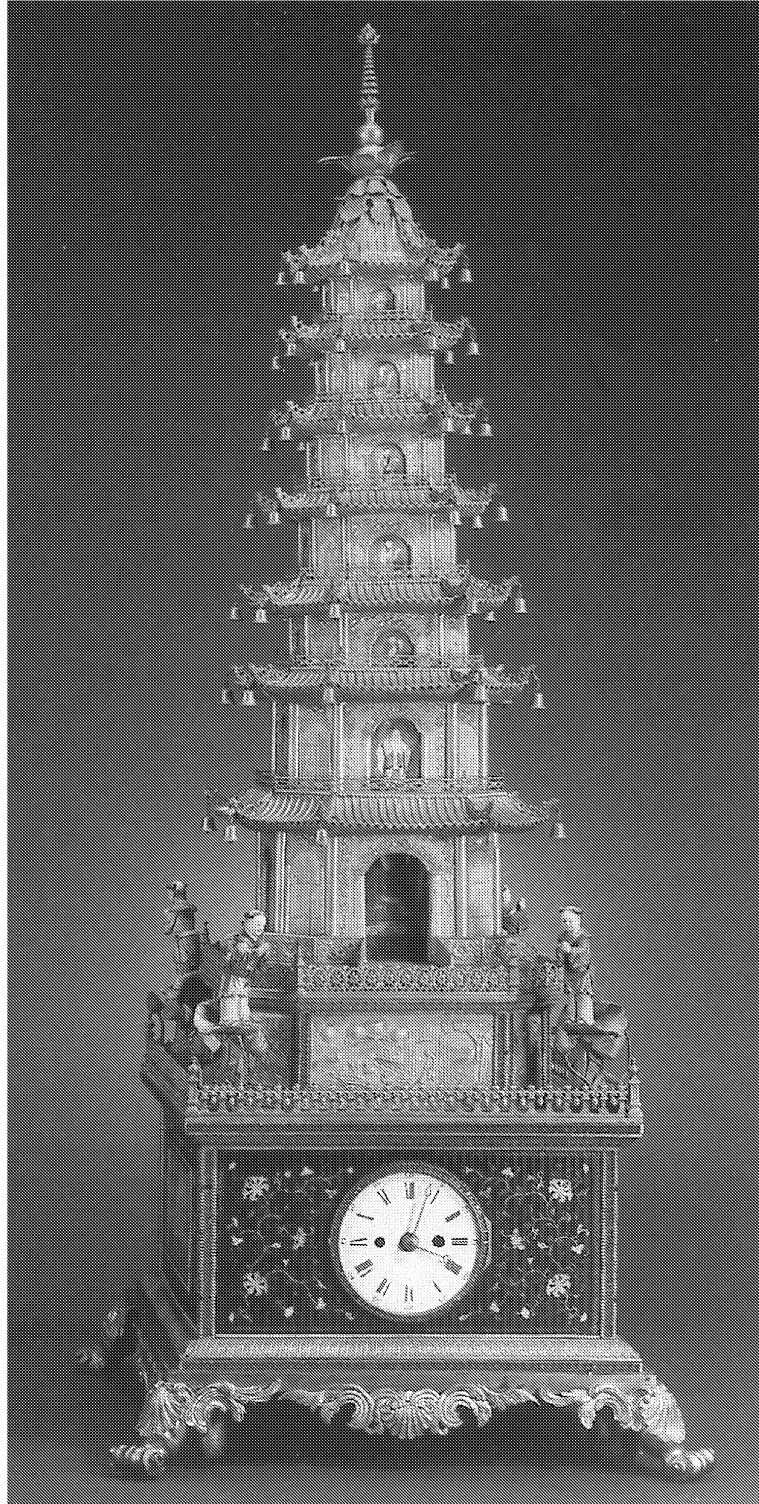


Fig. 39. Gilt bronze and enamel musical clock in the form of a multitiered pagoda. Height 111 cm. Guangzhou, Qianlong period. Palace Museum, Beijing.

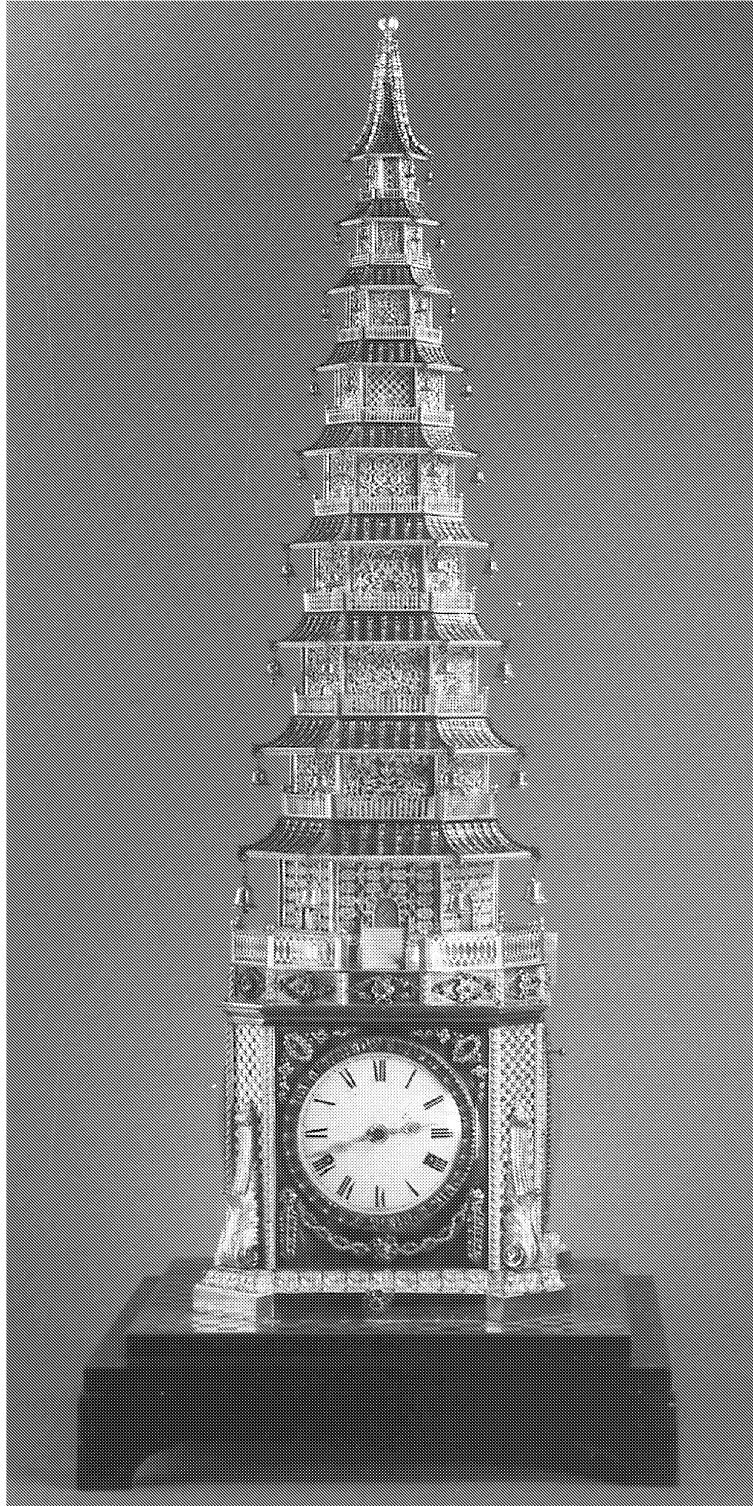


Fig. 40. Gilt bronze musical clock in the form of a multitiered pagoda, unknown English maker, eighteenth century. Height 126 cm. Palace Museum, Beijing.

overall aesthetics of the palace-made clocks, these pieces show stronger ties to other Chinese art forms than the clocks manufactured in Guangzhou. Several characteristics identify the clocks made in the palace. Finely polished *zitan* wood is prevalent, and the overall design of the clocks is more restrained: there are fewer auxiliary features and less lavish use of gilt bronze and colored glass stones than clocks from Guangzhou or Europe. The painted enamel work on these clocks is extremely fine. Palace clocks often bear the mark *Qianlong nianzhi*, "Made in the year of Qianlong," or *Qianlong yuzhi*, "Made by imperial command of Qianlong."

The skills of the palace makers and their attention to detail are seen in a large *zitan*-wood clock in the form of a double-roofed Chinese building (fig. 41). This structure sits atop a large squared wooden case containing a clockface placed within a large rectangular cartouche with a background of gilt bronze floral scrolls on a gilt bronze ground surrounded by a border of pale carved jade. Small rectangular painted enamel panels on turquoise decorate this clock. The architecture here is depicted accurately in strong contrast to European clocks and even those made in Guangzhou. The palace craftsmen took care to depict carefully each row of tiles and the curve of the upturned eaves and have included the parade of mythological animals on the upper eaves as found on actual Chinese buildings.

Another distinguishing feature of the palace clocks is the use of delicately painted enamels on metal. For the majority of pieces, the background is a clear bright yellow painted with large multicolored lotus flowers carefully shaded in the *famille rose* palette. The technique of painting with enamels on metal itself appears to have been unknown in China prior to the arrival of the Jesuit missionaries, and it has been suggested that the technique first came to Guangzhou around 1683 before becoming known in Beijing in 1685.⁷⁵ Certainly, by the early eighteenth century, the Chinese knew of the technique, for the emperor had set up a workshop devoted to this art form within the Forbidden City. The Jesuits were requested to help staff the workshop. Matteo Ripa reported in 1716,

His majesty having become fascinated by our European enamel and by the new method of enamel painting, tried every possible means to introduce the latter into his imperial workshops which he had set up for the purpose within the Palace, with the result that with the colours used there to paint porcelain, and with several large pieces of enamel which he had brought from Europe, it became possible to do something. In order to have European painters, he ordered me and Castiglione to paint in enamels: yet each of us, considering the intolerable slavery that we would have to suffer by having to stay from morning to evening in a workshop filled with such a corrupt crowd of persons within the Palace, we excused

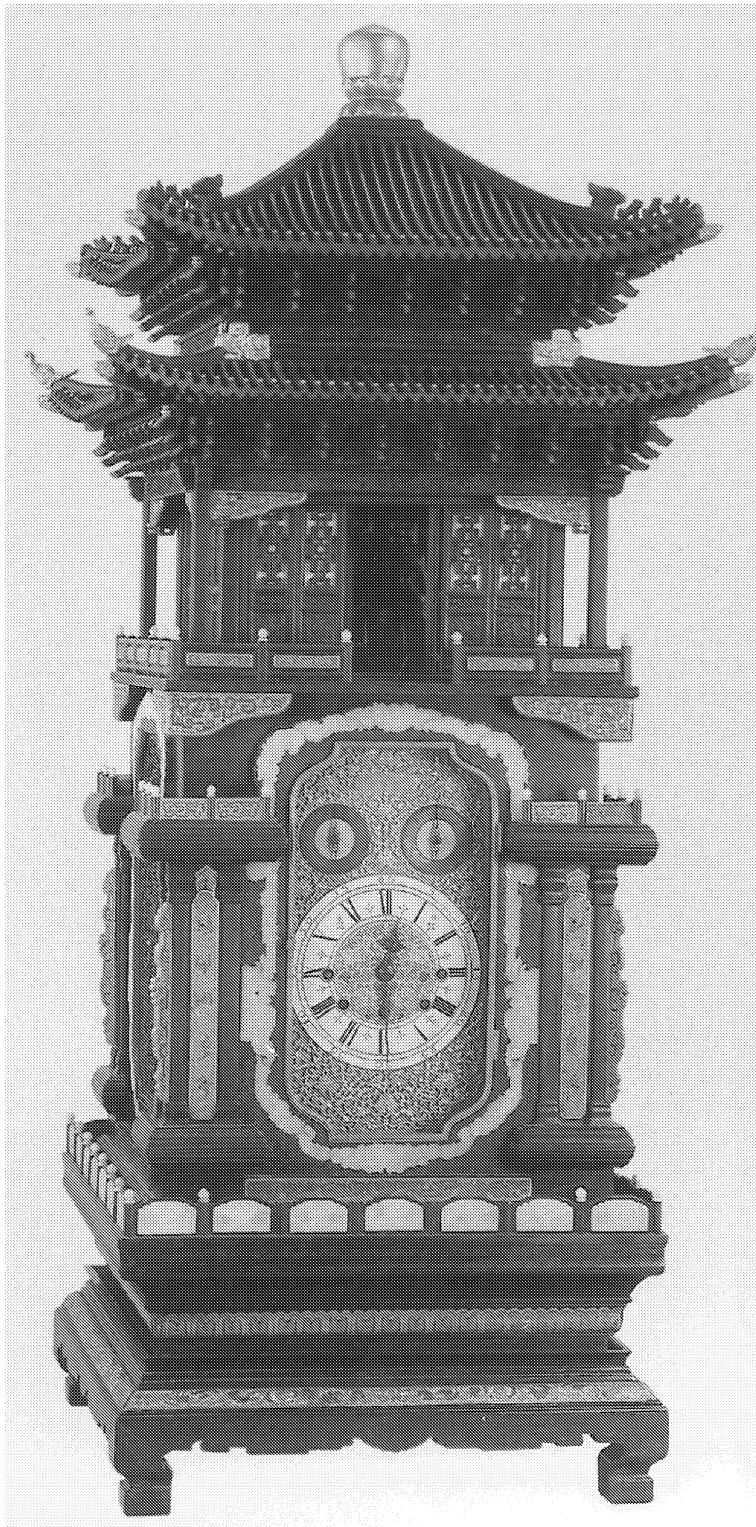


Fig. 41. *Zitan* wood, enamel, and jade clock in the form of a two-story building. Height 152 cm. Imperial clock-making workshop. Qianlong period. Palace Museum, Beijing.

ourselves by saying that we had never learnt that art. Notwithstanding that, forced by the command, we obeyed, and went on the thirty-first of the month. As neither of us had learned this art and making up our minds that we would never want to know it, we painted so badly that the emperor on seeing what we had done said: “Enough of that!” Thus we found ourselves freed from a galley-slave condition.⁷⁶

The Jesuits also introduced a new color to the enamels: a true pink derived from colloidal gold.⁷⁷ Invented in Europe around 1650 by Andreas Cassius of Leyden, the exact date of its introduction into China is unknown, although it was likely late in the Kangxi period.⁷⁸ The best painted enamels on metal were made in the palace workshop, and during the reign of Qianlong, these pieces took on a distinctly European flavor. The archival records of the palace clock-making workshop frequently mention the use of *falang wucai*: “enamels in five colors,” or multicolored enamels. This apparently was a very popular decoration for the clocks.

While many of the clocks made in the palace workshops owe their overall shape to European models, there are several based on existing Chinese forms. These include the wooden table screens (fig. 42) and standing screens containing a small clockface, their only connection to the West. One of the more unusual palace clocks is an armrest in the form of a cube (it is one of a pair, fig. 43). The top and bottom surfaces are padded and covered in a floral patterned silk resembling the lotus-and-vine scrolls of the painted enamel work done in the palace workshop. The other surfaces are covered in various geometric diaper patterns in gilt bronze. Opposite side panels have a large square decorated with a gilt bronze openwork medallion against a ground of clear glass underneath which is a piece of pale aqua-colored paper. This clock also plays music as a series of notes with no distinguishable tune.

While both the European and Chinese clocks made for Chinese consumption followed Western aesthetics and often incorporated the same decorative motifs, they differed greatly in their understanding of the nature of artistic taste in China. As evidenced in Cox’s catalogs, there was no difference in the clocks that Europeans made for either China or Europe. Made at a time when chinoiserie was the fashion, the popularity of these clocks in China mistakenly gave the impression that it was their “Asiatic splendor” that put them in such high demand. For the Chinese, elaborate European clocks were collected for their entertainment value and as examples of European style. Most importantly, however, clocks were highly sought after because they were expensive and rare and thereby signified exclusivity and power, not because of their stereotyped Chinese designs. It is clear that the interest the Chinese had in these pieces was not for their Chinese-style motifs, since they also collected



Fig. 42. Table screen with clockface. Height 85 cm. Imperial clock-making workshop. Qianlong period. Palace Museum, Beijing.

clocks in neoclassical style when chinoiserie had begun to fall out of favor in Europe. Rather they wished for anything European, and it was only coincidental that they began to consume European goods at a time when chinoiserie was popular. The oriental designs of the elaborate European clocks would have had the same appeal for the Chinese emperors as the Beauvais chinoiserie tapestries sent to China in 1768. As Hugh Honour writes:



Fig. 43. Gilt bronze clock in the form of an armrest. Height 30 cm. Imperial clock-making workshop. Qianlong period. Palace Museum, Beijing.

The mood of the tapestries is entirely that of European chinoiserie and one may wonder what Emperor Ch'ien Lung thought of the set which he received as a gift from Louis XV. No doubt he found them delightfully outlandish and un-Chinese, but he evidently appreciated something of their Gallic charm, for one panel was still hanging at the Imperial Palace at Peking [Yuanmingyuan] when it was sacked in 1860.⁷⁹

In effect, what “sold” the elaborate clock in China was the fact that it was an expensive European novelty.

Like their European counterparts, the Chinese craftsmen who were making elaborate clocks largely for the Chinese court also wanted to produce pieces in a taste that would appeal to their clientele. Whether they were constructing the inner working themselves or using parts imported from Europe, it was the exterior decoration of the elaborate clocks that was of primary importance to the Chinese. Given the foreign origins of the clocks, it is natural that the overall design would have come from the European decorative arts. As with other Chinese art forms, the addition of auspicious characters and motifs, however,

was necessary for the cultural and social context in which they were used and rendered them more popular by putting their European workings in a Chinese package. With the European motifs and traditional Chinese symbols that were incorporated into the clocks made by the Chinese craftsmen, the resulting pieces are true reflections of Chinese taste. They show the blending of styles at a time when the Western presence was being felt in China.⁸⁰

However, even within the world of the Chinese clock, differences emerge among the products made in the palace workshop and those produced in Guangzhou. While both contain distinctly Chinese elements, Guangzhou clocks show a closer connection to the European examples. This is undoubtedly the direct result of the presence of foreign goods in Guangzhou and the existence of an industry there that made items specifically for export to the West. It is obvious even from the clocks for imperial consumption that these makers were familiar with the European repertoire of designs and materials and were comfortable working with them.

The clocks manufactured in the palace give a different picture and are truer representatives of imperial taste. Although the European influence is unmistakable, these pieces are more restrained in their use of gilt bronze and colored stones. While charming nonetheless, there are few examples of the fanciful items such as twirling flowers and spinning stars that one finds on the European and Cantonese clocks. The enthusiastic exuberance of the Guangzhou clocks is absent. Their connection is stronger to other art forms made in the imperial workshops, such as enameling on metal, than to the clocks of the Chinese craftsmen in Guangzhou and suggests that some collaboration existed among crafts in producing elaborate clockwork at the palace.

But why were the European makers designing pieces that followed closely Western, not Chinese, taste even though many of their clocks were destined for the Chinese market? Among the reasons for this are the general economics of the clock trade, European perceptions of Chinese taste, and the overall attitudes that Europe had regarding China.

For the European clockmakers, the salability of their wares in Europe was of primary importance. It was in the home market where sales were greatest and reputations were built. By advertising the fact that their pieces were part of the collection of the emperor of China, makers such as James Cox were adding to their prestige. By stating that their clocks were made for the Asian, not European market, such makers were simply taking advantage of the European popularity of Chinese style in the decorative arts, increasing the appeal of their work and, by extension, the demand for it by giving the impression that the designs were genuinely Chinese. The makers of the elaborate clockwork pieces acknowledged the influence of “Asian pomp” in the decorative motifs. By suggesting, as James Cox did, that his work was “in the taste of the Orien-

talists” and was originally designed for the “Orientalists,”⁸¹ he was informing his European clientele that he understood true Chinese taste, and was prepared to provide it to them. As Cox wrote, these exotic elements were designed to make even the most “inveterate Cynic,” who regarded much of this kind of work as “a confused heap of wrought gold and jewellery” good only for producing “a dazzling glare only fit to fatigue the eyes,” see the merit of the introduction of such motifs, along with mechanisms that would entertain with both their music and movement, as well as with the magnificence of their design.⁸² However, few, if any, modifications in design were made that took into account the taste in China,⁸³ and the resulting pieces were different from those that the Chinese were making for their own market. The pieces sent to China were merely products designed in accordance with prevailing European taste; that they happened to be based on Chinese motifs and that the Chinese enjoyed them was purely coincidental. The clocks for the “Orientalists” were just as much at home in Europe as those made for the European market. In fact, a notice in the *St. James’s Chronicle* of 1773 stated that a large shipment of elaborate clocks purchased for Qianlong was originally designed for Cox’s Spring Gardens museum.⁸⁴

On a broader level, these European clocks say much about Western perceptions of Chinese taste. European artists of the eighteenth century were limited in the kinds of visual images to which they could turn for inspiration in their interpretations of the Far East. They had as their sources of information illustrated travel accounts that offered a Eurocentric perspective of an exotic and far-off culture, and published books of so-called Chinese designs that were first filtered through the European imagination and often contained elements of Indian and Japanese motifs. The early chinoiserie designs themselves served as a foundation for later works, thereby generating their own version of Chinese life. Even with the arrival of firsthand images that showed a less exotic Asia in the late eighteenth century, it was the earlier, more fanciful, and completely unrealistic designs that held the attention of the public.⁸⁵ Europeans still had little understanding of Chinese taste and connoisseurship, or of the aesthetic precepts that underlaid the style.

Furthermore, European artists had had little exposure to true Chinese taste: the only real sources of information on the arts of China were the export porcelains made in areas such as Guangzhou for the foreign market, and these did very little to dispel the European myths about the Far East. Many of these pieces themselves were Chinese “chinoiseries,” made in response to the dictates of their European clientele who wished Chinese art to be what they were taught to expect, not what it actually was. This “debased exoticism” with its “hackneyed images”⁸⁶ of stereotyped pagodas, bamboo, willow, landscape scenes, and pigtailed mandarins, reinforced the inaccurate image that the West already had of China. This persisted well into the nineteenth century, as

seen in the popularity of the willow pattern on tableware. Based on Chinese underglaze blue porcelains painted with stylized river landscapes and designed originally by Thomas Minton in 1780, this Blue Willow pattern and its variations have been used by many pottery and porcelain factories, including Spode and Wedgwood up to the present day. Such was the pattern's popularity that it even developed its own “romantic legend” concerning the various figures and other elements in the scene.⁸⁷ Oddly, the Chinese were asked by their European craftsmen to copy these chinoiseries for some of their export ceramics.⁸⁸

The clocks and watches produced in Europe for the China trade illustrate graphically the West's overall lack of understanding of China and an inability or perhaps a reluctance to adapt to the demands of a foreign culture. For them, China was an enchanted, fanciful fairyland that they represented in their chinoiserie designs. Had the European makers truly wanted to create pieces for the “Orientalists,” they would have sought to understand the symbolic motifs found on Chinese clocks and added them to their pieces. However, these makers were content in thinking that the Chinese liked these pieces for their “Asiatic splendor,” when, in fact, the clocks were collected for a variety of other reasons. Furthermore, their primary concern was with their European clientele who wished to see an imaginative, stereotyped Chinese style; they had no real interest in understanding Chinese aesthetics or learning about the complex symbolism.

Such attitudes are representative of an overall European cultural superiority with regard to the Chinese. Europeans in the eighteenth century preferred to think of China as an idealized, fictionalized, and stereotyped exotic land, and this was an attitude that they were reluctant to change. This lack of interest in learning about the real China was to have serious consequences for Europeans in the next century when trade conflicts resulting from cultural misunderstandings and ignorance gave rise to the most dramatic Sino-European encounter: the Opium War of 1839 to 1842.

These clocks are more than elaborate amusements; they also serve as tangible evidence of the attitudes between two cultures at a time when contact was increasing. The Western mechanical clock introduced a new and important technology to the Chinese, while Chinese design, whether genuine or, more commonly, filtered through the European imagination, powerfully influenced the European decorative arts. The interest that the Chinese had in elaborate clockwork was not for their Chinese-style motifs, since they also collected clocks in neoclassical and Gothic styles. Rather the Chinese wished for anything European, and it was only coincidental that they began to consume European goods at a time when chinoiserie was still popular. In effect, what sold these pieces in China were their associations with Europe. Europe, on the other hand, was much more affected by Chinese style, and the work of James

Cox is but one example of a movement that saw manifestation in furniture, metalwork, textiles, and ceramics. The craze for anything of Chinese flavor in the decorative arts is perhaps best captured by James Cawthorne, who wrote in 1756:

Of late, tis true, quite sick of Rome, and Greece,
We fetch our models from the wise Chinese:
European artists are too cool, and chaste,
For Mand'rin only is the man of taste.⁸⁹

Conclusion

In 1615 Nicolas Trigault commented on the gifts that Claudio Aquaviva, the general of the Society of Jesus, sent to the missionaries in China in the early seventeenth century.

He also sent certain gifts that were very helpful in the mission work, among which was a painting of Christ, done by a well known artist in Rome, and four time-pieces, well wrought and artistically designed. Three of these were watches, made to be worn on a cord about the neck, so that the subtle workmanship of the machinery could be readily seen. The fourth, considerably larger, was a clock, designed for a table. It was more valuable than the watches because of its intricate works, without weights, and because it not only kept good time and struck the hours, but also sounded the half hours and the quarters in triple chimes. This time-piece became the talk and the admiration of the entire Kingdom of China, and with God's blessing it was destined to produce results that are still evident at the present time.¹

When he wrote of the “results that are still evident at the present time,” Trigault was most likely referring to the Jesuits' success in setting up a permanent residence at Beijing. He could not have known that these lasting results would be not the establishment of Christianity in China, but rather the introduction of European clockwork technology.

Beginning with the first gift of a Western mechanical clock to the Chinese court by Matteo Ricci in 1601, China's emperors enjoyed and collected these pieces in great quantities over the next two hundred years. The apparent novelty of these items and the great interest they aroused led the Europeans to believe that the Chinese had never known any type of clockwork. This, however, was untrue. While Chinese horology predated that of Europe, the technology was lost several centuries before the arrival of Ricci and his “self-ringing bells,” which explains in part the curiosity in these objects shown by the Chinese. The elaborate cases of the European clocks and their miniaturized

movements complete with chimes made them desirable commodities and placed them high among the imperial collectibles.

Clocks, more than any other artifact, represent the meeting of East and West in China's late imperial period. They figured prominently in the main areas of cross-cultural interaction in the seventeenth and eighteenth centuries: they were of primary importance in the Jesuit missionaries' proselytizing strategies, they were used to great effect in ambassadorial contacts, and they formed an element of the growing Sino-European trade. As products that combined the latest fashions in the European decorative arts with the epitome of Western mechanical technology, elaborate clocks were unlike anything the Chinese had known, and through them we may trace the dissemination of European style and technology in China. However, these clocks were more than artistic or technological objects that had the practical ability to tell the time. In late imperial China, clocks functioned in many different ways and carried with them a variety of meanings given to them by those who made and used them.

For the Jesuits who introduced this technology to China, these ingenious pieces of mechanical design offered them access to the highest reaches of Chinese society and with it, they hoped, the opportunity to make converts to Christianity, beginning with the emperor himself. In their efforts to establish the Roman Catholic Church on Chinese soil in the seventeenth century, the Jesuits used their knowledge of the sciences, especially mechanics, and their access to European objects including clocks and watches, to aid them in their proselytizing endeavors. Clocks were for them evangelical tools like breviaries or hymnals. The Jesuits taught Chinese craftsmen and were instrumental in helping to set up the imperial clock-making workshop in the Forbidden City. Ricci's designated successor, Nicolo Longobardi (1556–1654),² wrote that gifts of clocks and automata to the emperor were to be used as "magnificent present[s] worthy of the Emperor when the mandarins judged that the moment had come to submit the great request to him, namely to proclaim the liberty of Christian teaching."³

Clocks gave the Jesuits a means of penetrating the Chinese empire and thus were a useful tool. But for them the clock also carried much deeper meanings. Clockwork provided a direct link to Matteo Ricci, who was ultimately responsible for the Jesuit presence at the court. Ricci himself had taught mechanics to court eunuchs in keeping with his proselytizing strategy of using science to promote Christian teachings. While the missionaries soon found themselves relegated to work as watch- and clockmakers and repairers, and not as bearers of a new faith to a vast country as had been expected, their roles were still in keeping with their mission of providing spiritual guidance through their skills in mechanics. These notions were expressed earlier in the philosophical writings of Bonaventure, where the clockmaker and the clock

represented God and the creation. The clock became a metaphor for the higher teachings the Jesuits hoped to instill in the Chinese: understanding mechanics would lead to an understanding of the Holy Scripture; accepting clocks would lead to an acceptance of Christianity. These strong religious meanings could not have escaped Jesuit notice.

The Jesuits were not the only Europeans to use the clock's appeal to gain favor with the Chinese court: diplomatic ventures also included clocks and watches as an important part of the gifts sent from Europe. In an effort to impress the Chinese monarch with the skill and ingenuity of British manufactures, Lord Macartney carefully selected the presents brought with his embassy in 1793. Prominent among them were clocks and watches, given by George III and by Macartney himself. In Macartney's hands, clocks became emblems of Britain's superiority and progress. However, while the gifts were welcomed, the requests for more open trade were not. As the Qianlong emperor had written in his edict to King George III of England regarding the king's request to have a representative reside in Beijing and to trade in British goods, "We have never valued ingenious articles, nor do we have the slightest need of your country's manufactures."⁴ When relations between Britain and China became strained beyond repair in the mid-nineteenth century, clocks and other imperial possessions adopted an alternate image: that of loot taken from the Qianlong's summer palace, the Yuanmingyuan, in 1860. Placed on display in Europe with other "spoils" taken during the pillage, these clocks became symbols of final British dominance over the Chinese.

This event was one of several that contributed to the diminution of the once-vast Chinese imperial collection of clocks and watches. Immensely popular with the Qing court, clocks were actively collected by the emperors in the seventeenth and eighteenth centuries. By the time Qianlong's reign began in 1736, the imperial palace not only had an impressive accumulation of elaborate clocks, but a workshop had been established within the palace devoted to the construction of these items for the emperor's personal use. While the Qianlong emperor has been known for his interest in collecting, clocks were unique: no other item of such unmistakable Western origin was collected to this degree.

However, Qianlong's collection went beyond being simply an accumulation of "things" and can offer insights into the meanings of objects under Qianlong's reign. With the many choices of Western art available to him, Qianlong chose to collect clocks because of their exclusivity. Unlike other examples of art in his collection, clocks were based on a technology previously unknown to the Chinese and thus were not widely available, setting them apart from other objects such as painting and textiles for which there were existing, albeit different, native traditions. In the eighteenth century, manufacture was limited, confined largely to the palace workshops or the city of

Guangzhou; it was not until the nineteenth century that clock making was practiced more widely in China. With all of the palace production allocated to the court, and with much of the Guangzhou clocks, including those that were imported from the West, designated for the emperor, clocks were not readily available for other consumers. Thus, the elaborate Western-style clocks became a colorful representation of imperial power and status. As objects firmly associated with the West in the Chinese mind, these clocks also reveal an acceptance of aspects of Western culture.

The effects of Qianlong's collecting interests were also seen outside the court. Those courtiers and officials who wished to emulate imperial taste purchased clockwork, as did members of the newly emerging affluent merchant class who were given to ostentatious displays of wealth.⁵ Like the clocks in the emperor's collection, these objects were also symbols of status and rank: those who owned clocks were either in a position to receive them as gifts or had the means to purchase them. Through acquiring, displaying, and using clocks, the consumers of these objects could show overtly his position in society as owners of the newest in technology and style. It may also have been implied that the wearer of a watch grasped the principles of Western technology, understood the significance of the clock's function, and found a use for it in daily activities—regardless of the wearer's actual circumstances.

For the European clockmakers, China offered a new market that held the potential for healthy profit. For some, the Chinese market was an end in itself, one to which they needed to adapt in order to ensure the salability of their pieces; for others, it also served as a means of increasing sales at home. James Cox of London, whose reputation was built on extravagant and expensive “pieces of ingenuity,” used his successes in China when promoting his work in London. Quick to draw attention to the fact that his creations were in the possession of the Chinese ruler, Cox could thus claim that he had full understanding of true Chinese taste, as evidenced by the enthusiastic response his pieces received in the land where this style originated. This, according to Cox, confirmed the superiority of British ingenuity, further glorifying the empire. However, while Cox met with initial success, his failure to see the Chinese market as more than one-dimensional undermined his business. Swiss makers, such as the firm of Jaquet-Droz et Leschot, realized the potential in consumers outside the court and adapted their pieces to these needs. Eventually the Swiss dominated the clock and watch market not only in China but worldwide as well.

We can read much from clocks concerning Sino-European cross-cultural impressions in late imperial China. The items produced in Europe for the China trade are tangible reminders of Europe's general lack of understanding of China. For the British, whose products formed the majority of the trade in

the eighteenth century, these clocks also reveal imperialist attitudes combined with an inability, or perhaps an unwillingness, to adapt to a foreign culture.

During the eighteenth century, when the bulk of elaborate clocks was sent from Europe to China, chinoiserie was a popular style in European decorative arts. A purely European vision of the Far East, based largely on illustrated travels accounts and embellished by the designers' own imaginations, chinoiserie promoted an "Oriental splendor" far removed from the original source of inspiration. It touched all the decorative arts, and the style was particularly popular for the clocks produced during this time. Although some of the European designers made pieces for the Chinese market and claimed to have adapted their pieces accordingly, there was no real difference between those made for Europe and those for China. The clocks for the "Orientalists" (the Chinese) exhibited the same European conception of "Eastern magnificence" and would have looked just as much at home in Europe, given the pervasiveness of chinoiserie.

It was mistakenly believed that the Chinese liked these pieces for their "Asiatic splendor," when, in fact, the clocks were considered typically European and were collected for reasons other than appearance alone. The popularity of the chinoiserie clocks in China encouraged the designers to continue working in this mode. The use of stereotypical motifs reveals that the Europeans knew nothing of true Chinese taste or connoisseurship, and more than likely were not particularly interested. Furthermore, the only real sources of information on the arts of China were export pieces made in areas such as Guangzhou for the foreign market, with designs that the Chinese had adapted from European pieces. In plying their export trade, the Chinese were constructing their own chinoiseries modeled after those of Europe. This only reinforced the inaccurate image that Europe had of the exotic East. Perhaps more accurate indicators of eighteenth-century imperial taste are the clocks constructed by the Chinese themselves, for which they borrowed from a number of different European styles, combining them with traditional Chinese motifs.

Clocks served an important function in late imperial China by introducing the Chinese to an important technology and encouraging the dissemination of imperial taste (and the means to produce it) to other regions of China. But more importantly, examining clocks in their social and cultural context forces a reconsideration of the standard assessments concerning the extent of Western influence on the art of late imperial China and reveals that the communication and exchanges that occurred between China and Europe were significant, overcoming mutual ignorance and the distance between these two cultures.

It has been generally held that Western influence on Chinese art was minimal, restricted to the court, and confined largely to the decorative arts. These arguments have been made through the examination of the scholarly

arts of painting and calligraphy, in which the literati continued to work in a traditional Chinese manner. China's own artistic traditions, it has been said, were so deep-rooted that the affection for Western motifs was in the end merely a stylistic fashion. The novelty of oil paints and use of shading and perspective as found in European painting, for example, aroused interest at the Chinese court, but because the Jesuit missionary artists who were stationed in Beijing painted only for the emperor, their work was very rarely seen outside the palace. Of the Chinese painters, only the professional and craftsman artists painted in a European manner, and even then it was by request. Of eighteenth-century China, it has been said that "Western technology and the Western arts were confined to serving Ch'ien-lung's own domestic and courtly needs."⁶

When we think of the intense interest that [the missionary artists] aroused in the seventeenth century, we cannot help being surprised that their ultimate achievement was so meagre. . . . The influence of Western art, if it did not peter out altogether, trickled like sand to the lower levels of the professional and craftsman painters, where it stayed until modern times.⁷

Such assessments are made using a narrow definition of the term *art*, which refers primarily to painting; the products of the jade carver, clockmaker, and potter belong to a lesser category known as the decorative, or "minor," arts. While it is indeed true that the literati painters were little affected by European aesthetics, one cannot discount the importance of the many professional artists and craftsmen who adapted Western designs and materials to suit their own needs in creating products for a society that demanded them. By considering only scholars' painting in determining the extent of European influence in China, it appears that the influence of the West was not so strong: "Thus we are drawn to the conclusion that the influence was one acting in reverse: the Chinese proving the stronger over the European. The missionary-artists in their efforts to gain the goodwill of the emperors, consciously, as well as unconsciously adapted themselves to Chinese requirements and standards, when they realized that their European subjects, methods and techniques were not understood or appreciated."⁸

But in examining clockwork, we can see that the "European subjects, methods and techniques" were indeed appreciated even if not fully understood. This had profound consequences in the development of technical expertise in the areas of mechanics and craft by promoting the skills necessary to produce them. European clockwork revitalized what had become in China a terminal technology, incapable of further development. Furthermore, as much of the clocks' appeal lay in their unusual decoration, the materials from

which they were made were also of interest. This is especially true of the brightly colored painted enamels on metal, a skill that the Chinese were eager to learn from the Jesuit missionaries. The high degree of artistry in design, construction, and repair required led to the establishment of an imperial clock-making workshop within the Forbidden City, one of a number of workshops inspired by Louis XIV's Académie Royale des Sciences. Outside the court, craftsmen in already established artisan communities took advantage of the growing demand for clocks. In the southern Chinese export trade cities of Suzhou and Guangzhou, where clock making was practiced extensively, the Chinese learned the craft by imitating both the elaborate cases and the workings of clocks arriving from Europe. Guilds were also an important part of the clock-making profession, and features such as instruction in the French language and membership in the Roman Catholic faith reveal a connection to the guilds' foreign origins.

The "self-sounding bells" of late imperial China were a combination of European mechanics and a Sino-Western blend of decorative styles whose appeal at the courts of the Kangxi and Qianlong emperors was felt throughout the Chinese empire. It was through these clocks that the Chinese were introduced to and eventually acquired important technical and artistic skills that had far-reaching implications not only in allowing the makers to compete against imported products but also in introducing a basic technology for an important fundamental machine. More than elaborate amusements, clocks serve as tangible representations of attitudes between two cultures whose contacts were increasing dramatically. With their European technology encased in a shell that combined East and West, these elaborate timepieces are microcosms of the interaction between two very different cultures in the period from sixteenth- to late-eighteenth-century China.

Appendixes

The Imperial Workshops

Until recently, the generally accepted history of the palace workshops came from S. W. Bushell's *Chinese Art*, published in 1906 and revised in 1909.¹ According to Bushell, there were twenty-seven workshops that were established in 1680 and lasted until the death of the Qianlong emperor (r. 1736–95) in 1799, after which they were closed one by one. The last remaining workshops were burned to the ground in 1869.² However, studies by such scholars as Yang Boda, Chang Lin-sheng, and Craig Clunas, as well as recent examinations of archival material in the Forbidden City, have revealed Bushell's discussion of these workshops to be a rather simplified view of a complex and constantly changing organization, with the total number of workshops fluctuating between a low of thirteen to a high of forty-two. One of these was the Office of Clock Manufacture, Zuozhongchu.

The history of the imperial workshops dates to the latter part of the Ming dynasty (1368–1644). From available information, it appears that in the mid–sixteenth century, the office known as the Yuyongjian (Office of Imperial Use), staffed by eunuchs, was responsible for overseeing the manufacture of objects for use of the emperor, including furniture, lacquer, and ivory objects.³ By the late Ming dynasty, the manufacture of goods for palace use was under the direction of the Imperial Household Department, termed *Neiwufu*,⁴ which was formally inaugurated in 1638 with the completion of a new building specifically to house this office, and which acted as the emperor's personal treasury. The *Da Qing huidian* (Statutes of the Great Qing) reports,

In the third year of Chongde (1638), the Office of the Imperial Household (*Neiwufu*) was completed outside the Daqing Gate. It was made up of six units: three in one row facing east and in the opposite row another three facing west. There were six units for offices of the Secretariat; five two-story buildings; and seven buildings which afterwards were used as the Main Office of the Imperial Household.⁵

Under the reign of Kangxi emperor of the Qing dynasty, the organization of the Imperial Household Department saw fundamental changes, beginning in 1667 when Kangxi took effective rule (he was a minor during the first five years of his reign). These changes would continue into the seventeenth century. Although new branches were added throughout the dynasty, the basic structure of the Imperial Household Department consisted of ten components: seven sections and three departments, one of which was the Guangchusi (Section of Supply). This section was considered to be the most important and at this time included under its administration the craftsmen who manufactured goods for court use.⁶

It was not until the thirty-second year of the reign of Kangxi (1693) that the workshops were formally established under the administration of the Office of Manufacture, Zaobanchu, of the Imperial Household Department in order to organize palace production more efficiently.⁷ The Kangxi emperor had been inspired by reports from Joachim Bouvet (1656–1730) of the Académie Royale des Sciences of Louis XIV, an institution that stressed both arts and sciences. Bouvet was one of six Jesuits sent by the king of France to bolster the French presence in China in an effort to break the monopoly on religious activities held by the Portuguese. Bouvet was accompanied by Jean de Fontaney (1643–1710), Jean-François Gerbillon (1647–1707), Louis-Daniel Le Comte (1655–1712), Claude de Visdelou (1656–1737), and Guy Tachard (1648–1712, who remained in Siam); the group landed at Ningbo in July 1687, reaching Beijing in February 1688, when they presented the emperor with gifts from the French court.⁸ In his effort to create a similar institution, Kangxi had craftsmen from all over China brought to the capital to staff these factories.⁹ The workshops themselves were located in a number of buildings spread over a large area in the western section of the Forbidden City: a crowded, bustling precinct of the Inner Court during the Kangxi and Qianlong reign periods. In addition to the palace workshops, this area contained storehouses, residences for members of the imperial family, temples, and the accommodations for some of the staff, including the eunuchs, gardeners, and maids. In later times, parts of this section were closed off with some of the buildings being used for storage.¹⁰

The total number of *zuofang* (workshops) in the Forbidden City changed throughout the Qing dynasty. Bushell calculated twenty-seven and suggested that this number remained unchanged, but this was far from the actual situation as revealed by more recent studies. Furthermore, not only did the number of workshops fluctuate, but Bushell's original number was also incorrect. Clunas, in examining the 1818 edition of *Da Qing huidian shili*, a work that Bushell likely used, found that by punctuating the text differently, there were in fact thirty-one workshops.¹¹ In his general discussion of the Qing period, Dan Shiyuan mentions approximately forty workshops.¹² It is clear that the

number did fluctuate. Prior to 1758, there were forty-two.¹³ In 1758, Liu Liangyu reports that there were thirty-eight workshops, but that they were then reorganized with twenty-nine of the workshops being consolidated into five, with the remaining nine keeping their original names, making a total of fourteen workshops.¹⁴ One of these made clocks. Later that year, this number was reduced to thirteen; and in 1783, there were fifteen. This continued to the Guangxu period (1875–1908), when the number of workshops was reduced to fourteen.¹⁵

There were two main areas where the Zaobanchu operated. The earliest was at the complex of the Yangxindian (Hall for the Nourishment of the Spirit), located in the northwestern quarter of the Forbidden City, likely set up during the reign of the Shunzhi emperor (r. 1644–61). Prior to the establishment of the Office of Manufacture in 1693, there were more than 3,279 craftsmen and workers in the workshops, with 196 artisans at the Yangxindian, under the administration of the Section of Supply of the Imperial Household Department.¹⁶ The second location was next to the Wuyingdian (Hall of Heroism), in the southwestern section of the palace, established early in Kangxi's reign, probably around 1680.¹⁷ A map of the palace compound of 1788 indicates an area marked as the Zaobanchu in the western precincts. It is located well north of the Wuyingdian and to the south of the Yangxindian; immediately to the south are offices of the Imperial Household Department, Neiwufu (map 1).¹⁸ This building is no longer extant.

Judging from extant archival records concerning the production of goods for palace use, the Yangxindian appears to have been the main site of manufacture well into the eighteenth century.¹⁹ Records from 1724 tell of artisans who worked in the Yangxindian being moved to the Cininggong (Palace of Peace and Tranquility),²⁰ and in his letter dated November 17, 1725, Father Maria de S. Giuseppe Rinaldo mentions that craftsmen in the decorative arts were working at the Yangxindian.²¹ The association of the Yangxindian, as one of the original centers of production, with the objects made in the workshops persisted well into the late eighteenth century as the name Yangxindian zaobanchu continued to be used.²²

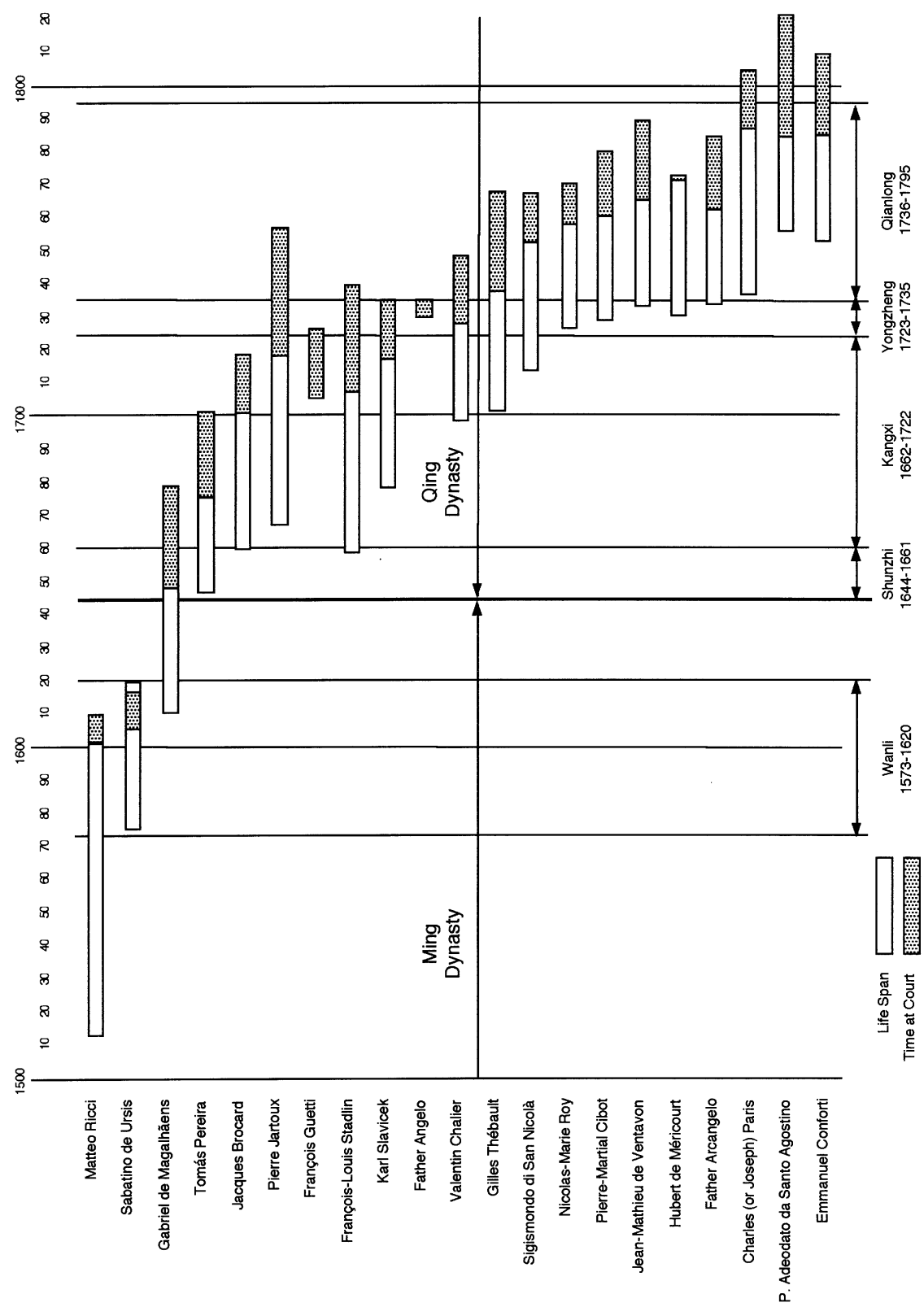
Other areas served as locations for the *zuofang* as well. In the thirtieth year of Kangxi (1691), some workshops were moved to a remodeled area of the Chafanfang (Imperial Kitchen) of the Cininggong located northwest of the Baohedian (Hall of Preserved Harmony) and north of the Zaobanchu.²³ The cloisonné workshop, originally in the Wuyingdian in the southwest corner of the complex, was one of these workshops moved to the Cininggong,²⁴ as were many of the other workshops, following a reorganization. This may have included the Ruyiguan,²⁵ just south of the Qixianggong (located in the area of the Six West Palaces, west of the Qianqinggong (Palace of Heavenly Purity), whose rooms were occupied by painters, calligraphers, jade workers, and

other craftsmen.²⁶ Here the emperor would visit his painters and watch them work.

In addition to the palace complex at Beijing, the Summer Palace of the Yuanmingyuan (Garden of Perfect Brightness) also served as a location for the workshops. Situated just twelve kilometers northwest of Beijing and south of the Great Wall, the Yuanmingyuan was begun in 1709 under the Kangxi emperor as a garden for his son, Yinzhen, who would later become the Yongzheng emperor. Under Qianlong, the Yuanmingyuan became one of the three imperial residences (along with the palaces at Beijing and Jehol) and was enlarged to include a series of European palaces designed by the Jesuits and initially constructed between the years of 1747 and 1759, with additions made in 1768. It was also under Qianlong that a pavilion, also known as the Ruyiguan, was built at the Yuanmingyuan. Here, a number of Jesuit artists worked, living in the village of Haidian and walking to the nearby Ruyiguan.²⁷ Staffing this workshop were ivory carvers, watchmakers, stone carvers, and Chinese and Jesuit painters.

European Clockmakers at the Chinese Court, 1601–1822

European Clockmakers at the Chinese Court, 1601-1822



European Makers of Clocks and Automata for the Chinese Market

A number of European clockmakers produced items that became part of the China trade. The following list, compiled for the most part from Baillie's *Watchmakers and Clockmakers of the World*, includes available information on the known works of some of these makers. Although this list is by no means comprehensive, it is intended to provide a foundation for study on these makers and their products.

Anthony, William (ca. 1764–1844), London

Anthony always made his watches in pairs, many of which were for the Chinese market (P2, 108; GB, 7).

Eight-day watch, ca. 1810, signed “William Anthony, London, No. 1707”
(P2, 108)

Aubert, F.,¹ Geneva

Musical enameled watch, ca. 1815 (P2, 109)

Baillon, Paris

A number of makers with the name Baillon existed in Paris in the eighteenth century, among them François (active ca. 1749), Jean Baptiste (d. ca. 1770, watchmaker to Marie Antoinette), G. (active ca. 1750), Estienne (active 1774), Jean Baptiste Albert (active 1772–84), and R., B., and François (GB, 13 and xxv).

Urn with watch, ca. 1775 (H-S, 11)

Barbot, John London

Barbot was listed in 1751 as “Goldsmith, The Great Lion, Great St. Andrew’s Street, Seven Dials.” His work was favored by the Qianlong emperor.² He made musical clocks with automata (GB, 15).

Musical bracket clock in Adam style, ca. 1780 (H-S, 11)

Musical clock (H-S, 11: PM³ no. 141, pl. 10; also illustrated in LY, 86)

Musical clock with box-shaped pedestal, ca. 1780 (H-S, 11; also illustrated in LY, 90)

Musical clock with box-shaped pedestal of painted scenes, similar to above, ca. 1780 (LY, 92)

Musical clock with base in shape of a grotto, ca. 1780 (LY, 88)

Musical clock with four elephants at the base, surmounted by a spire, ca. 1780 (LY, 89)

Barrow, John, London

Large clock in the form of an elaborate building supported by four camels, signed “Jn^o Barrow London,” ca. 1770 (LY, 122)

Bennett, John, London

Elaborate bracket clock, 1846–97 (LY, 119)

Berger, Isach (Isaac), Copenhagen

Became master in 1753 and specialized in gold watches with enameling (GB, 24).

Small gold watch, ca. 1760 (H-S, 12)

Biddulph, Samuel, London

Horse with thirty-hour watch at one time in the Ionides Collection⁴

Blois and Morlier,⁵ Paris

Borrell, Henry, London

A maker of musical clocks and watches, active from 1794 to 1840 (GB, 33).

Musical clock, signed “Henry Borrell, London⁶ (illustrated in LY, 100)

Bovet Family, London and Fleurier

The lineage of this family of clock and watchmakers is as follows:

Father: Jean Frédéric (d. 1818)

Sons: Frédéric (1786–1850)

Alphonse (1788–1850)

Gustave (1790–1835)

Edouard (1797–1849)

Charles Henri (b. 1802)

The Bovet family was responsible for a number of watches sent to China; these could be signed “Bovet, London,” “Bovet à Fleurier” or “Trevob” (P2, 106).

On occasion the watches were signed in Chinese with the characters “Bowel” (P2, 106). The family made watches for the Chinese market until 1864. In 1857, there is mention of Bovet Frères & Co., whose agent was Fabian Sebastian Noterman (BL, 27).

Bovet, Edouard (1797–1849), Fleurier

Edouard Bovet went to London in 1815. In 1818, he went to Canton, where in 1822, he started a society for commerce in watches in China with his brother Alphonse. The society lasted until 1864. Bovet went back to Fleurier in 1826 (GB, 35). He was often called “Le Chinois” owing to his association with China.

Hunter watch, ca. 1900, signed “Bovet, London” (P2, 111)

Bovet, Charles Henri (b. 1802), Fleurier and Guangzhou

Went to Guangzhou in 1824; returned to Fleurier in 1839 (GB, 35).

Bovet, Louis, Neuchâtel

Brockbank, John, London

Large gilt bronze vase of two large jeweled flowers set atop large rectangular base containing the clockface and having painted moving scenes, ca. 1770 (LY, 121)

Broome, Thomas, London

The earliest date of activity for Thomas Broome is 1734.

Small enameled watch, dated 1734 (H-S, 12)

Bugnon, Alexis (active nineteenth century), Neuchâtel

Bulloch (Bullock) (active eighteenth century), England

Burkardt, F.-S., Neuchâtel

Cabrier, Charles (d. 1777), London

A famous maker of both father and grandfather watches. In 1730, the business was located at the Dial, Tokenhouse Yard, in the parish of St. Margaret, Lothbury. He came from a long line of watchmakers: both his father Charles (active 1719) and his grandfather Charles (active late seventeenth–early nineteenth century) made clocks. His sister Rebecca was also involved in the business in the late eighteenth century, eventually joining with Gabriel Leekey (GB, 49; BL, 38).

Pair of octagonal enameled boxes, ca. 1760 (H-S, 12: WYT⁷ no. 215, pl. 11)

Pair of octagonal agate and gilt bronze boxes, ca. 1757–72 (LY, 92)

Carpenter, William, London

Three clockmakers with the name William Carpenter were active in London in the late eighteenth century: William of Soho (London), active 1770–1805, who made clocks for the India trade and whom Baillie lists as the possible maker of the pieces in the Palace Museum, Peking; William, active 1783, for whom no information is available; and William, active 1792 (GB, 52).

Pair of musical clocks in the form of a large stag supporting a clock in an oval frame, topped by a spinning “glory,” ca. 1780 (H-S, 12: WYT no. 644, pl. 12; illustrated in LY, 151)

Pair of watches, ca. 1780 (H-S, 13: WYT no. 639, pl. 13)

Pair of musical clocks, ca. 1795 (H-S, 13: WYT no. 11, pl. 14; illustrated in LY, 152)

Musical clock set atop rectangular base with painted enamel medallion, the whole topped by a figure that strikes a bell (LY, 148)

Elaborate gilt bronze clock with palm trees and glass waterfalls tipped by a spinning “glory” (LY, 149)

Clock set in an oval frame and supported by two cranes atop a rococo base (LY, 150)

Watch, the face surrounded with green and red glass-paste stones, the outer case painted in enamels with two women holding doves (LY, 152)

Clarke, George, Leadenhall Street, London

A musical clock in the Qianlong emperor’s collection, “made early in the present [eighteenth] century,” was noted by Sir George Staunton, a member of Lord Macartney’s embassy to Peking in 1792. The dial read, “George Clarke, Clock and Watch Maker, in Leadenhall Street, London.”⁸

P. Cluerse Clock Co., France

A nineteenth-century maker.

Coleman, London

Gilt bronze musical clock, eighteenth century (LY, 91)

Cox, James (d. ca. 1791), London

Refer to chapter 3 for information on Cox.

Pair of agate boxes, ca. 1770 (H-S, 13)

Pair of musical clocks, ca. 1770 (H-S, 13–14)

- “Musical piece” attributed to Cox, dated 1771 (H-S, 14)
- Pair of elaborate timepieces of a small child holding a large bouquet of flowers, all atop a large vase, ca. 1770 (H-S, 14: PM no. 66, pl. 15; also illustrated in LY, 104)
- Pair resembling no. 66 above, dated 1769 (H-S, 14; illustrated in LY, 102)
- Mechanical birdcage dated 1783 (H-S, 15: WYT no. 27, pl. 16; also illustrated in LY, 115)
- Musical clock dated 1767 (H-S, 15)
- Pair of musical timepieces in the form of an *escritoire*, supported by four rhinoceroses, ca. 1765–70 (H-S, 15: PM no. 91, pl. 17; also illustrated in LY, 106)
- Musical timepiece similar to no. 91 (H-S, 16)
- Pair of elaborate timepieces, ca. 1775 (H-S, 16)
- Musical timepiece in the form of a horse and tent, ca. 1770 (H-S, 16: WYT no. 554, pl. 18; illustrated in LY, 114)
- Pair of agate boxes, ca. 1770 (H-S, 16, WYT no. 1130, pl. 19A, B)
- Pair of brown agate lamps with watches, ca. 1770 (H-S, 17)
- Pair of musical clocks, dated 1771 (H-S, 17)
- Pair of complex clocks dated 1770 (H-S, 17: PM no. 111, pl. 20; also illustrated in LY, 103)
- Pair of musical timepieces ca. 1770 (H-S, 17: PM no. 72, pl. 21)
- Pair of musical timepieces, similar to above, ca. 1770 (H-S, 18)
- Pair of pieces, similar to above, ca. 1770 (H-S, 18)
- Stag with musical clock, ca. 1780,⁹ with W. H. Craft musical clock, 1773–91 (P1, 73)
- Watch in shape of scent bottle, ca. 1780, signed “James Cox” (P2, 102)
- Automaton clock made in England for the China trade, signed “James Cox & Gowland, London,” ca. 1770–80¹⁰
- Timepiece of cream agate in gilt bronze mounts, key dated 1765 (LY, 99)
- Clock in the form of a ram supporting an agate and gilt bronze box, signed “Jas Cox London 1766” (LY, 101)
- Clock in the form of an agate and gilt bronze box surmounted by a large vase of glass-paste flowers, 1766 (LY, 101)
- Musical clock in the form of a two-tiered building atop a jeweled bull, ca. 1770 (LY, 103)
- Musical clock in the form of a two-tiered building surmounted by a clockface in a jeweled star, and containing a glass-rod waterfall, the whole supported on four gilt bronze lions, signed “J. Cox Fecit, London, 1771” (LY, 105)
- Musical clock in the form of a “Turkish” building, supported by four large palm trees with a gilt bronze rooster between them, 1775 (LY, 107)

- Gilt bronze crane supporting a two-storied pagoda in which is set a clockface, ca. 1780 (LY, 108)
- Agate box with gilt mounts supporting an elaborate structure of urns, an elephant, columns topped by figures carrying baskets, ca. 1780 (LY, 109)
- Clock, surrounded by moving, painted scene, supported on the backs of four elephants, ca. 1780 (LY, 110)
- Pink agate box with gilt mounts supported by four crocodiles, ca. 1780 (LY, 110)
- Gilt bronze bull and palm tree atop a rectangular base containing mechanical painted scenes, ca. 1780 (LY, 111)
- Large gilt bronze caparisoned bull supporting a large vase of jeweled flowers and standing on an aventurine base with gilt bronze mounts, ca. 1780 (LY, 111)
- Agate box with gilt mounts supported by four lions, with large urn of jeweled flowers and a bird, ca. 1770 (LY, 112)
- Watch with glass-paste gems, ca. 1780 (LY, 113)

Craft, W. H., London

Baillie lists a W. Craft of London who was active 1773–96 in making automata and clocks (GB, 69).

Davenport, London

Watch, ca. 1780 (H-S, 18)

Delui, England

Musical clock in the form of a three-tiered building, eighteenth century (LY, 94)

Dimier, Charles Louis (1822–96), La Chaux-de-Fonds

Dimier, Auguste Antoine (1824–91), La Chaux-de-Fonds

The Dimier brothers, sons of Jean Antoine Dimier (1795–1863) of Geneva (GB, 85), established their own *maison* in Fleurier ca. 1846. While Charles Louis was in China, Auguste Antoine stayed in Fleurier, organizing their manufacturing business.¹¹ They used the characters that have been transliterated as *Dian na* on the watches made for China (P2, 106).

Duck, G., London

Enameled half-vase with repeating watch, ca. 1750 (H-S, 18: PM no. 671, pl. 22)

Dutertre, Paris

There were seven eighteenth-century makers by this name working in Paris, none of whom worked later than midcentury. These include Jean Baptiste, an eminent maker who constructed pieces for the Russian court; Charles; Jean Abraham, the son of Jean Baptiste; and his brother Nicolas Charles (GB, 94).

Edwards, William, London, Holburn and Cheapside

Active from 1744 to 1793, Edwards was a member of the Livery Blacksmiths' Company and was succeeded by Christopher Moon (GB, 97, 223).

Pair of timepieces, ca. 1770 (H-S, 19)

Emery, Josiah (b. ca. 1725–97), London (from Geneva)

Macartney took two watches by Emery as presents to the Qianlong emperor in 1792 (GM, 355).

Fleetwood, Robert (d. 1794), London

Fleetwood was a member of the Livery Goldsmiths' Company (GB, 110).

Musical clock, ca. 1760 (H-S, 19)

Fox and Sons, London

Pair of musical clocks, ca. 1780 (H-S, 19)

Frisard, Jacob (1753–1812), Geneva, Bienne, and London

Frisard was a maker of fine watches and was especially important as he invented a sliding piston for modulating the song of artificial birds by reducing the volume, thus improving the tone. He perfected and miniaturized a system of bellows, constructed the first watch with a singing bird on the back, and developed a system of air brakes that allowed the gears to mesh noiselessly. In the early nineteenth century, he made numerous trips to the Near East. His pieces were constructed for the India, Turkey, and China trades (GB, 115).

Gilt bronze and enameled "sing-song" in the form of a bird-headed cup (LY, 125)

Fromanteel and Clarke, Amsterdam

Ahasuerus Fromanteel (1640–1703), the son of Ahasuerus Fromanteel of Norwich, the first maker of pendulum clocks in England, went to Amsterdam with his brother some time around 1680; his daughter met and married Christopher Clarke there in 1694. The partnership lasted until Fromanteel's death in 1703; Clarke later formed a partnership with Roger Dunster.¹²

Pair of musical clocks, ca. 1740–50 (H-S, 19)¹³

Gamot, G., Paris

Pendant watch with enamels by Blois and Morlier, 1640–50 (P1, 66)¹⁴

Gardner, Thomas, London

Gilt bronze clock topped with mythological bird, eighteenth century (LY, 133)

Godfrey, Henry (active 1685–1707), London (GB, 126)

Watch, signed "Henry Godfrey, London," ca. late seventeenth–early eighteenth century, Coll. Musée de Genève (P1, 69)

Godin, Paris

Timepiece, ca. 1770 (H-S, 19)

Halstead, John, London

The son of a Fleet Street clockmaker, John became free of the Clockmakers Company, 1698–1710 (GB, 141).

Half-vase, ca. 1720; the attached pendant has a movement by Wilson (H-S, 20)

Clock in the form of a three-tiered pagoda supported on the back of an elephant; the clockface has Chinese characters for numbers (LY, 116)

Hatt, William, London

Table clock with tortoise shell case and gilt bronze mounts, eighteenth century (LY, 153)

Henderson, Robert (active 1768–1805), London

Musical clock, ca. 1775 (H-S, 20)

Hesigal, John, London

Vase of jeweled flowers set atop rectangular base with painted scenes, eighteenth century (LY, 121)

Higginson, George, London

Son of Samuel of Chatham.

Pair of musical timepieces, ca. 1760 (H-S, 20: WYT no. 16, pl. 23 (also illustrated in LY, 96)

Clock in the form of a three-tiered building set upon four lions, eighteenth century (LY, 97)

Howes, William, London

Clock set in a porcelain rococo case, eighteenth century (LY, 154)

Hughes, William, London (High Holburn)

Made watches specifically for China. Free of the Clockmakers Company between 1781 and 1794.¹⁵

Pair of bloodstone boxes, ca. 1770 (H-S, 21)

Dressing table mirror on a rectangular base, ornamented with cut-glass obelisks, enamels, and gilt bronze figures (H-S, 21, pl. 24A, B; also illustrated in LY, 156)

Watch with a painted moving scene on the face and painted enamels on the case, ca. 1770 (LY, 154)

Clock with two-storied rectangular base supported by four rams and topped with an urn containing a clockface, ca. 1770 (LY, 155)

Hunter, Thomas, London

Pair of enameled watches, painted with image of the Virgin and Child, eighteenth century (LY, 132)

Bracket clock with small figure and topped by small pavilion (LY, 134)

Ilbery (Ilbury), William (d. 1839), London

William Ilbery was active in the late eighteenth century and made watches specifically for the Chinese market. He is credited with developing a style of watch known as *la montre chinoise* (GB, 166). His son (b. ca. 1805, active until 1843) conducted business in London, Fleurier, and Canton (GB, 166).

Enameled gold watch, ca. 1812, signed “Ilbery, London, No. 6100” (P2, 110)

Enameled gold watch, ca. 1816, signed “Ilbery, London, No. 7068” (P2, 110)

Enameled gold watch, ca. 1825, signed “Ilbery, London, No. 6249” (P2, 110)

Inwood, James, London

Inwood apprenticed in 1713 (GB, 167).

Pair of brown agate caskets, ca. 1770 (H-S, 21)

Pair of gray agate caskets, ca. 1770 (H-S, 21)

Jaquet-Droz, Pierre (1721–90), La Chaux-de-Fonds

The talented mechanics Pierre Jaquet-Droz and his son Henri-Louis worked with Jean-Frédéric Leschot (1746–1824). Refer to chapter 3 for further information.

Jaquet-Droz, Henri-Louis (1752–91), La Chaux-de-Fonds, Geneva, and London

Gold and enamel watch, London, ca. 1787, formerly Belin Collection
(P1, 70)

Cage with singing birds, ca. 1790 (P1, 75)

Jeanneret, Louis-Auguste (active nineteenth century), Neuchâtel**Josephson, John, London**

Active before 1751–81 (GB, 175).

Pair of pink agate caskets, ca. 1770 (H-S, 21)

Just, Leonard, London

Made watches for the Chinese market. Baillie gives his working dates as 1790–1825, while Loomes gives them as 1832–44 (GB, 176; BL, 130).

Juvet, Edouard (1820–83)

Used several trade names in China, which included U Nah (P2, 107).

Larrymore, Thomas, London

Musical timepiece, ca. 1780 (H-S, 22)

Laurent, Félix (active 1787–1800), Guangzhou, China

Laurent was with the firm of Co, Beale and Laurent of Canton beginning in 1792.

Laurent, François**Lepaute, Paris**

There were eleven clockmakers with this name, all working in Paris. Of particular note is Jean André (1720–1787 or 1789), who was clockmaker to the king (GB, 194).

Le Roy, Julien (1686–1759), Paris

Julien Le Roy was named *Horologer du Roi* in 1739 and was known for his fine work. He was the first to make a thin striking watch in which the hammers struck the case rather than an internal bell (GB, 195). The horizontal arrangement he devised for turret clocks was first used in the clock tower housing Big Ben. His son, Pierre, was famous for designing a duplex escapement and for his hand in the development of the chronometer.¹⁶

Gold and porcelain watch, ca. 1760 (P1, 70)

Enameled watch, ca. 1755, Musée du Louvre (P1, 70)

Carriage watch, signed “Julien Le Roy à Paris,” dated 1738 (P1, 74)

Repeater watch, signed “Inventé par Julien Le Roy en 1740,” ca. 1745
(P1, 74)

Leschot, Jean-Frédéric (1746–1824), Geneva, Chaux-de-Fonds, and London

Jean-Frédéric Leschot worked with Pierre and Henri-Louis Jaquet-Droz. See chapter 3 for further information.

Macune, Thomas, London

Musical bracket clock with painted scene about clockface (LY, 135)

Magniac, Francis, London

Maillardet, Henri (b. 1745), Fontaines and London

Beginning in 1784 until about 1815, Henri Maillardet worked in London, where he managed the firm of Jaquet-Droz and Leschot until 1791. After the death of Jaquet-Droz in that year, he “worked on his own account.” His watches are signed “Henri Maillardet, London.” He invented the single whistle with a moving piston for singing mechanical birds (GB, 207).

Birdcage with clock, ca. 1785, attributed to Maillardet (P2, 103)

Maillardet, Jean David (1748–1834), London, Fontaines, and La Chaux-de-Fonds

Brother of Henri Maillardet, Jean David made watches for China (GB, 207).

Marriott, John (d. 1824), London (Fetter Lane) (GB, 210)

Musical clock, movement by Marriott, base signed “Lewis Pantin,” ca. 1790 (H-S, 22: PM no. 57, pl. 25; also illustrated in LY, 124)

Gilt bronze clock in the form of a young boy (LY, 128)

Martin, Thomas (d. 1811), London (Cornhill and Royal Exchange)¹⁷

Timepiece, ca. 1785 (H-S, 23)

Meylan, Philippe-Samuel (1772–1845), Brassus and Geneva

Philippe-Samuel Meylan was an eminent maker of watches and automata. He went to Geneva in 1811, and worked with L. Audemars and Isaac Daniel Piguet from 1811 to 1828 (GB, 219). See Piguet & Meylan.

More, William, London

Pair of brown agate caskets, ca. 1770 (H-S, 23)

Mottram, John, London (GB, 226)

Active from 1790 to 1808.

Musical clock with urn, color plate¹⁸

Musical clock¹⁹

Newton, James, London

Bracket clock with painted scene, signed “James Newton London” (LY, 118)

Norton, Eardley (1728–92), London (St. John Street) (BL, 173)

A well-known maker of watches and clocks. In 1771, he patented a striking mechanism for clocks and repeating work for watches (GB, 235).

Musical bracket clock, ca. 1765 (H-S, 23: PM no. 58, pl. 26)

English striking bracket clock in Chinese wood case, signed “Eardley Norton, London, 1863” (Christie’s H.K. Tues 13 Jan 1987 lot 403)

Padeval, Henry, Paris

Cartel clock, ca. 1740 (H-S, 24: WYT no. 59, pl. 27)

Pembroke, George, London

Pair of enameled watches, ca. 1740 (H-S, 24)

Petitpierre, Charles-Henri (b. 1769), Beijing, Macao, Manilla, and Batavia

The son of Swiss watchmaker Pierre David, Charles-Henri traveled as a member of the Macartney embassy to Beijing, where he was in charge of looking after the clocks (GB, 250).

Philp, Robert, London

Free of the Clockmakers Company from around 1740 to 1781 (BL, 185).

Musical clock in a “Turkish” case, ca. 1790 (H-S, 24, illustrated in LY, 130)²⁰

Piguet, Isaac-Daniel (1775–1841), Geneva

A maker of fine complex watches (GB, 252). See also Piguet & Capt and Piguet & Meylan.

Piguet & Capt, Geneva

The partnership between Isaac-Daniel Piguet and Henri Daniel Capt lasted from 1802 to 1811 (GB, 252).

Eight-day watch, ca. 1810, attributed to Piguet & Capt (P2, 109)

Piguet & Meylan, Geneva

Isaac-Daniel Piguet was in partnership with Philippe Samuel Meylan from 1811 to 1828. The company was known for its very fine watches, which were often signed “P.M.” (GB, 252).

Enameled watch, ca. 1812 (P1, cover)

Gold and enamel watch, ca. 1815, signed “P.M.” (P2, 102–3)

Pair of watches, ca. 1818 (P2, 104)

Rose-shaped watch, ca. 1820, Musée Th. Beyer (P2)

Plummer, Charles, London

Musical timepiece, ca. 1760, similar to one by Sellers (H-S, 24)

Preyer, London

Pair of oval boxes, ca. 1780 (H-S, 25)

Pyke, George, London

Son of well-known clockmaker John Pyke, of London (GB, 260).

Musical clock, ca. 1770 (H-S, 25)

Quare, Daniel, London

Clock in the form of an enameled wall vase, eighteenth century (LY, 94)

Racine, Henri, Neuchâtel**Rayment (Raiment), Thomas, London (Old Jewry) (GB, 264)**

Earliest date of activity 1708; free of the Clockmakers Company 1719–68.²¹

half-vase, ca. 1750, movement by Rayment (H-S, 25)

**Recordon, Louis et Dupont, Charles, Geneva and London
(Tottenham Court Road)**

These makers worked out of London and exported a number of pieces to China.²² In 1795, Dupont and Recordon purchased Josiah Emery’s business. Recordon retired in 1796, and Dupont carried on alone (GB, 93, 265).

Rich, John

There were two clockmakers by the name of John Rich: one of London, active in the mid-eighteenth century and the most likely maker in this case; and one of Bristol, United States, active from 1763 to 1812 (GB, 268; BL, 197).

Musical watch in form of flask, ca. 1790, Galerie d’Horlogerie Ancienne (P1, 70)

Rimbault, Paul, London (Denmark St.) (GB, 270)

Active from 1770 to 1785.

Musical “Balloon” clock, ca. 1785 (H-S, 25)

Sacred Mountain Clock, 1760–80, maker unknown, but possibly Rimbault, now in the collection of the Time Museum, Rockford, Illinois²³

Clock with large face, 1770–85 (LY, 129)

Clock with waterfall, 1770–85 (LY, 130)

Rimbault, John Stephen (active 1744–85), London (Great St. Andrew’s St.) (GB, 270)

Repeating clock, ca. 1765 (H-S, 25)

Rochat Brothers (1770–1850?)

Musical case with singing bird, ca. 1825, signed “F.R.” (P2, 100–101)

Rochat, Louis (active nineteenth century), Brassus (GB, 273)

Musical timepiece, which Harcourt-Smith labels “superb,” ca. 1829 (H-S, 26: PM no. 1087, pl. 28A, B)

Scott, William, London

Table clock with wooden case and gilt bronze mounts, frame around dial painted in enamels in a multicolored floral pattern, eighteenth century (LY, 153)

Sellers, Robert, London

Active from before 1748 to around 1755 (GB, 288).

Musical timepiece, ca. 1755 (H-S, 26)

Shutter, William, London

Active in the mid-eighteenth century (GB, 290).

Musical timepiece with chinoiserie figures and elephants, ca. 1755–58 (H-S, 26; illustrated in LY, 157)

Similar to above, slightly damaged (H-S, 26)

Silver, Joseph, London

Oval enameled box, ca. 1800 (H-S, 26)

Pair of watches, ca. 1790 (H-S, 27)

Chinese-style lion, ca. 1805, formerly Ionides Collection²⁴

Smith, James, London

Bracket clock, ca. 1770 (H-S, 27)

Bracket clock, eighteenth century, signed “James Smith London” (LY, 117)

Taylor, John, London

Pair of repeating watches, ca. 1780 (H-S, 27)

Elaborate bracket clock of gilt bronze with two figures that strike the bell, signed “John Taylor, Meer Fields, London,” eighteenth century (LY, 123)

Gilt bronze clock crowned with pagoda (LY, 125)

Terryman, Thomas, London

Elaborate construction in the form of a jeweled grotto with animated scenes, eighteenth century (LY, 136)

Thompson, Charles (or Chester) (active ca. 1788), London

Musical clock, eighteenth century, color plate²⁵

Tomlin (Tomlyn), Edward, London (Bartholomew Lane and Royal Exchange) (GB, 315)

Pair of musical clocks, ca. 1775 (H-S, 27)

Travers, Adam

Musical clock with mirror, eighteenth century (LY, 87)

Tregent, James, London

Well-known watchmaker to the Prince of Wales (GB, 317).

Pair of timepieces of bull standing on rocaille base, ca. 1790 (H-S, 27)

Clock with five dials supported by four gilt bronze fish, eighteenth century (LY, 120)

Vale, John, London

Pair of musical clocks with elephants, waterfalls and palm trees, ca. 1790 (H-S, 27; illustrated in LY, 126)

Elaborate structure with waterfalls, figures ringing bells, the whole supported by four horses, eighteenth century (LY, 158)

Similar to above, with rectangular base (LY, 159)

Vaucher, Edouard, Fleurier

Enameled gold watch, ca. 1830, signed “Vaucher Fleurier” (P2, 110)

Vaucher Frères (active 1800–1866), Fleurier and Guangzhou

These brothers are not to be confused with a Geneva firm of the same name, active ca. 1780–1830, operated by brothers Claude and César (GB, 325).

Veigneur, Geneva

A firm by the name of Veigneur Frères operated out of Geneva between 1770 and 1800; beginning around 1800, the company was known as Veigneur Frères et Coret (GB, 326).

**Vulliamy (François-)Justin (active 1730–ca. 1790), London
(Pall Mall)**

From a family of fine Swiss clockmakers, Justin Vulliamy settled in England ca. 1730 (GB, 329). One clock by this maker was given by Macartney embassy to the Qianlong emperor in 1793.

Ward, Benjamin, London (Norton Folgate)

Musical clock, ca. 1780 (H-S, 28)

Musical clock, ca. 1765 (H-S, 28)

Musical clock with glass waterfall, ca. 1765–1790 (LY, 93)

Ward, Robert, London

Musical clock in the form of a young boy leading a ram, clockface set into base, 1779–1808 (LY, 131)

Watch, with row of clear and red glass-paste stones surrounding face, marked “1063” (LY, 132)

Wicksteed, Edward, London

Musical clock, eighteenth century (LY, 95)

Musical clock of similar design to one above, eighteenth century (LY, 97)

Williamson, Joseph (d. 1725), London (Clemens Lane)

An eminent maker who served as watchmaker to the king of Spain. He claimed to have invented the equation mechanism in a paper presented to the Royal Society (GB, 344).

Pair of watches, ca. 1715, may have been part of Kangxi’s collection (H-S, 29)

Williamson, Timothy, London

Active from 1769 to 1788, Timothy Williamson made pieces for the emperor of China, including musical automata and musical clocks with automata, one of which has a figure writing in Chinese characters (GB, 344).

Pair of gray agate flasks, ca. 1775 (H-S, 28)

Pair of musical timepieces in the form of an urn with animated scene topped with a grotto with jeweled flowers, ca. 1770–80 (H-S, 29; illustrated in LY, 137)

Musical clock, ca. 1780 (H-S, 29)

Musical clock in the form of a rocky grotto, ca. 1775 (H-S, 29: PM no. 175, pl. 31; also illustrated in LY, 144)

Repeating watch, ca. 1780 (H-S, 30)

Similar to above, ca. 1780 (H-S, 30)

- Similar to above, with enameled outer case (H-S, 30)
- Pair of musical timepieces, damaged, ca. 1790 (H-S, 30)
- Pair of musical clocks, ca. 1775 (H-S, 30: PM no. 111, pl. 32; also illustrated in LY, 143)
- Pair of musical timepieces of a shepherdess seated within a trellis; at her feet are sheep and rocks, ca. 1780 (H-S, 31; illustrated in LY, 147)
- Musical clock with automaton (H-S, 31: PM no. 1029, pl. 33A, B; also illustrated in LY, 138)
- A small telescope fitted with a clockface at one end, ca. 1780 (LY, 138)
- Elaborate construction consisting of glass waterfalls, birds, swans, and two obelisks set atop a rectangular base with painted enameled panels, ca. 1780–95 (LY, 139)
- Elaborate clock with waterfalls, gilt bronze and enameled foliage, all set atop four elephants, ca. 1780–95 (LY, 140)
- Gilt bronze clock with columns, birds, and architectural features, ca. 1780–95 (LY, 141)
- Large gilt bronze table clock with painted scenes, topped with a vase of glass-paste flowers, ca. 1780–95 (LY, 142)
- Three-sided table clock with painted scenes, topped with a glass waterfall, ca. 1780–95 (LY, 143)
- Wooden table clock with gilt bronze mounts, topped with mechanical bird in a tree, 1780–95 (LY, 145)
- Clock in the form of a three-tiered pagoda, with painted enamel medallions of figures, ca. 1780–95 (LY, 146)
- Watch with painted enameled case with figures, ca. 1780–95 (LY, 146)

Wilson, London

- Pendant to an enameled half-vase by Halstead (H-S, 31; see Halstead)

Wright, Thomas (d. 1792), London (Poultry)

Watchmaker to the king (GB, 349).

- Musical clock, signed “WRIGHT, Watchmaker to the KING, on the POULTRY, London”²⁶

Notes

Introduction

1. This is not the first time that EPCOT Center has hosted a Chinese exhibition; in 1982, “Treasures of the Forbidden City” began its U.S. showing there. Following the success of “Artistry in Time” in 1987–88, a selection of clocks from the Palace Museum has been shown in Japan. See *Karakuri dokei* (Mechanical clocks) (Osaka: NHK, and Beijing: Palace Museum, 1995).

2. Comments made by Frank Wells, president and CEO of the Walt Disney Company, in *Artistry in Time: Decorative Timepieces of Imperial China* (EPCOT Center, Walt Disney World, 1987), 3. For more information about this exhibition, see Fang Guojin, “Meiguo Aolanduo Disini dongyuanzhongde ‘Zijincheng zhenbaozhan’” (Exhibition of treasures of the Forbidden City at Walt Disney World in Orlando, Florida, U.S.A.), *Gugong bowuyuan yuankan* 1987, no. 3: 69–72.

3. *Artistry in Time*, 2.

4. James Cox, *A Descriptive Catalogue of the Several Superb and Magnificent Pieces of Mechanism and Jewellery, Exhibited in Mr. Cox’s Museum, at Spring Gardens, Charing Cross* (London, 1772), with an end notice dated March 2, 1772.

5. Jonathan D. Spence, *The Memory Palace of Matteo Ricci* (New York: Penguin, 1984), 180. See Pietro Tacchi-Venturi, ed., *Opere Storiche del P. Matteo Ricci*, 2 vols. (Macerata, 1911–13), vol. 2: *Le lettere dalla China* (appendix 3), 402, 404, 406, letter of Ruggieri dated November 12, 1581.

6. The official had also received silks, mirrors, and other items, all of which were valued at more than one thousand gold pieces (MR, 136–37).

7. MR, 137.

8. MR, 137–38. This good fortune was not to last, as soon afterward the viceroy was relieved of his position. Later, however, the missionaries received word from Wang Pan (ca. 1539–1600), the governor of Zhaoqing, granting them permission to build there (MR, 144).

9. MR, 303, 313, 367, 371–72.

10. Clockwork technology is the foundation for all other machines and is of key importance in the modern industrial age. Lewis Mumford has said that “it marks a perfection toward which other machines aspire.” *Technics and Civilization* (New York: Harcourt, Brace, 1934), 14–15.

11. F. Alvarez Semedo, *The History of That Great Renowned Monarchy of China* (London: E. Tyler for John Crook, 1655), 183. The Jesuits were not treated to much “magnificence and courtesie” in their accommodation. They lived in tiny cubicles at

the hostel for foreigners, though their gifts did give them an allowance from the Board of Rites for food and other comforts, along with a servant. Eventually they were allowed to set up their own residence in the capital (Spence, *Memory Palace*, 194–95).

12. Chapuis has also written a comprehensive history of automata (*Les Automates, Figures Artificielles d'Hommes et d'Animaux: Histoire et Technique*, 1949) and has coauthored two other major works on automata: the first with Edouard Gélis (*Le Monde des Automates*, 2 vols. [Paris, 1928]), and the second with Edmond Droz (*Automata: A Historical and Technological Study*, trans. Alec Reid [Neuchâtel: Editions du Griffon, New York: Central Book Co., 1958]).

13. Joseph Needham, Wang Ling, and Derek J. de Solla Price, *Heavenly Clockwork: The Great Astronomical Clocks of Medieval China* (Cambridge: Cambridge University Press, 1960), 2d ed., with supplement by John H. Combridge (1986), 2. Subsequent citations are to the second edition.

14. Carlo M. Cipolla, *Clocks and Culture, 1300–1700* (New York: W. W. Norton, 1977), 7.

15. DL, xv.

16. Astronomical timekeeping, however, was different and required more precise reckoning of the hour.

17. Joseph Needham, *Science and Civilisation in China* (Cambridge: Cambridge University Press, 1954–), vol. 4, pt. 2, p. 435.

18. Needham, *Science and Civilisation*, 1:243; refer also to table 9 on the same page.

19. MR, 23. Here Ricci describes Chinese incense clocks and out-flow clepsydras.

20. In Europe, the verge escapement was probably invented in Italy or England in the late thirteenth or early fourteenth century and is alluded to in a treatise of astronomy written in 1271. Otto Mayr, “A Mechanical Symbol for an Authoritarian World,” in *The Clockwork Universe: German Clocks and Automata, 1550–1650*, ed. Klaus Maurice and Otto Mayr (Washington, D.C.: Smithsonian Institution, and New York: Neale Watson Academic Publications, 1980), 1; Eric Bruton, *The History of Clocks and Watches* (Orbis, 1979; rpt. New York: Crescent, 1989), 32. The verge escapement consists of “a vertical shaft with the two pallets and the balance wheel on top” (the name coming from the staff with two flags carried by the verger in Christian churches) (Bruton, *Clocks and Watches*, 34).

21. Needham, Wang, and Price, *Heavenly Clockwork*, xv and 208.

22. While Needham and his colleagues were conducting their research, similar work was being done in Beijing. Liu Xianzhou of Qinghua University published some of his findings in “Zhongguo zaiyuan dongli fangmiandi faming” (Chinese inventions in power-source engineering), *Qinghua daxue jijie gongcheng xuebao* 1, no. 1 (1953): 3, which appear to be the first modern Chinese references to Su Song’s work. It was not until 1958 that an article appeared in Chinese on Su Song’s clock specifically. Wang Zhenduo, “Jiekailiao Woguo ‘tianwenzhong’ de mimi” (The secret of our “astronomical clocks” revealed), *Wenwu cankao ziliao* 9 (1958): 5–9, illustrations on pp. 1–4.

23. These publications include “A Model of Su Song’s Escapement,” *Horological Journal* 103 (August 1961): 481; A. F. Burstall, W. E. Lansdale, and P. Elliot, “A Working Model of the Mechanical Escapement in Su Song’s Astronomical Clock Tower,” *Nature* 199 (1963): 1242–44; John H. Combridge, “The Celestial Balance: A Practical Reconstruction,” *Horological Journal* 104 (February 1962): 82–86; John H. Combridge, “Chinese Water Clock,” *Horological Journal* 105 (November 1963): 347; John H. Combridge, “The Chinese Water-Balance Escapement,” *Nature* 204 (December 1964): 1175–78; John H. Combridge, “The Astronomical Clocktowers of Chang Ssu-Hsun and

His Successors, A.D. 976 to 1126,” *Antiquarian Horology* 9, no. 3 (June 1975): 288–301; John H. Combridge, “Clockmaking in China: Early History,” in *The Country Life International Dictionary of Clocks*, ed. A. Smith (Feltham, Middlesex: Country Life Books, 1979), 225–26; T. O. Robinson, “The Astronomical Clock of Su Song,” *Antiquarian Horology* 5, no. 11 (June 1968): 414–15; Joseph Needham, “The Missing Link in Horological History; A Chinese Contribution,” in Joseph Needham, *Clerks and Craftsmen in China and the West* (Cambridge: Cambridge University Press, 1970); Anthony J. Turner, *The Time Museum* (Rockford, Ill.: Time Museum, 1984); Robert K. G. Temple, “The Mechanical Clock,” *Courier* 41, no. 10 (October 1988): 26–27. This list is by no means exhaustive.

24. The construction of such models was advanced by the work of John H. Combridge. He continued to reinterpret and modify Su Song’s drawings and has revealed in greater detail the functions of the component parts. These are described in the second edition of Needham, Wang, and Price, *Heavenly Clockwork* (1986) in which Combridge provides a supplement collating research in this area since the first edition of 1960. Combridge also lists a number of other models in his supplement (206).

25. Ernst von Bassermann-Jordan, *Alte Uhren und ihre Meister* (Leipzig: Diebener, 1926), 17, cited in Needham, *Science and Civilisation*, vol. 4, pt. 2, p. 441.

26. Joseph Needham, Wang Ling, and Derek J. de Solla Price, *Chinese Astronomical Clockwork* (Florence: Tipographia Giuseppe Bruschi, 1956), 2

27. Needham, “The Missing Link,” 236, fig. 79. Su Song’s clock of the eleventh century was slightly more accurate than the late-sixteenth-century cross-beat escapement of Europe. This evidence comes from trial runs of models of this clock, which showed it to be incredibly accurate. However, it appears that over time, even this modern reconstruction became increasingly inaccurate (DL, 31).

28. Needham, Wang, and Price, *Heavenly Clockwork*, 3.

29. Song Lian, comp., *Yuanshi* (History of the Yuan dynasty) (Beijing: Renmin wenxue chubanshe, 1979), *juan* 48, 1b; and Fang Xuanling et al., comps., *Jinshi* (History of the Jin dynasty) (Shanghai: Shangwu yinshuguan, 1975), *juan* 22, 32b.

30. Secular name Zhang Sui.

31. Needham, Wang, and Price, *Heavenly Clockwork*, 74.

32. Liu Xu et al., comps., *Jiu Tangshu* (Old standard history of the Tang dynasty) (Beijing: Zhonghua shuju, 1975), *juan* 36, 1294–96.

33. This is cited in the *Taiping guangji* (Wide gleanings of the Taiping era), compiled by Li Fang (Taipei: Xinxing shuju, 1969), *juan* 226, 4a (2:880). This translation is by Antonino Forte in *Mingtang and Buddhist Utopias in the History of the Astronomical Clock: The Tower, Statue, and Armillary Sphere Constructed by Empress Wu* (Rome: Istituto Italiano per il Medio ed Estremo Oriente, Paris: Ecole Française d’extrême-orient, 1988), 109; the translation in Needham, Wang, and Price, *Heavenly Clockwork*, 82, differs slightly.

34. According to Forte, *Mingtang and Buddhist Utopias*, during this period the famous *mingtang* was built twice: first in 686 and then again in 696, after it had been destroyed by fire in 694.

35. Needham, Wang, and Price, *Chinese Astronomical Clockwork*.

36. Needham, Wang, and Price, *Chinese Astronomical Clockwork*, 2.

37. Needham, Wang, and Price, *Chinese Astronomical Clockwork*, 4.

38. Landes writes that Su Song’s clock “divided the flow of water into countable units and allowed relatively fine adjustment of the rate” (DL, 18).

39. DL, 11.

40. DL, 21.
41. DL, 21.
42. Forte, *Mingtang and Buddhist Utopias*, 11.
43. Needham, *Science and Civilisation*, vol. 4, pt. 2, p. 440.
44. Silvio A. Bedini, "The Mechanical Clock and the Scientific Revolution," in Maurice and Mayr, *The Clockwork Universe*, 23. Galileo continued to experiment with the notion of the isochronic pendulum and its application to clockwork.
45. Galileo's clock would probably have been superior to that of Huygens. Galileo did invent the most accurate pre-eighteenth-century escapement: the pinwheel (or frictional) escapement, which was used in 1666 in the clock of the Palazzo Vecchio in Florence. It was forgotten but was rediscovered in 1741 in France (Bedini, "Mechanical Clock," 24).
46. Needham, *Science and Civilisation*, vol. 4, pt. 2, p. 444.
47. Abbott Payson Usher, *A History of Mechanical Inventions* (Boston: Beacon Press, 1954), 312.
48. The actual inventor of the balance spring (also called a hairspring, for its fineness) has been disputed, with Huygens and Robert Hooke each claiming the title of inventor. Hugh Tait, *Clocks and Watches* (1983; rpt. London: Trustees of the British Museum, 1986), 53; DL, 125–28. See also Ernest Edwardes, *The Story of the Pendulum Clock* (Cheshire: John Sherratt and Son, 1971).
49. Usher, *History of Mechanical Inventions*, 304–5. There were other portable timepieces in use at this time. Sundials, which were mentioned in Egypt as early as 1300 B.C. and in the Greco-Roman world in 300 B.C., continued in use, the latest development being the pocket sundial of the fourteenth century. Christopher St. J. H. Daniel, *Sundials*, Shire Album 176 (Aylesbury: Shire Publications, 1986), 5.
50. Usher, *History of Mechanical Inventions*, 305.
51. With the need to have such a timekeeper, various European countries offered great prizes for the one who could invent such a device, beginning in the late sixteenth century. In 1660, both Huygens and Hooke tried unsuccessfully to construct such a timekeeper, and in 1661 Huygens produced a pendulum-powered marine clock that was of use on calm water only. It was not until the 1720s that a successful pendulum clock was developed; in the mid-eighteenth century, Harrison took the British government prize of twenty thousand pounds for his chronometer. These timekeepers were more accurate than those of the mid-nineteenth century, though not as accurate as those of the later part of the century (Usher, *History of Mechanical Inventions*, 322–26).
52. Song Lian, *Yuanshi*, juan 48, 7a–b. The *Yuanshi* also mentions a very elaborate water-powered clock made by the last Yuan emperor, Toghan Timur (1320–70), known by the reign name of Shundi, which dates to the mid-fourteenth century (*Yuanshi*, juan 45, 13b).
53. There is some doubt that the machines Le Comte saw were those made by Guo. Louis Le Comte, *Memoirs and Observations Topographical, Physical, Mathematical, Mechanical, Natural, Civil, and Ecclesiastical. Made in a Late Journey through the Empire of China, And Published in Several Letters* (London: Printed for Benj. Tooke, 1697), 65.
54. MR, 329–31. This lengthy passage contains descriptions of the four instruments at Nanjing.
55. LP, 2:645–46. Stumpf was born in Würtzburg and entered the novitiate in 1673.

He arrived in China in 1694 and held the position of Visitor for China and Japan from 1705 to 1720 (LP, 2:472–74).

56. For a full consideration of this subject, see Silvio A. Bedini, *The Trail of Time: Time Measurement with Incense in East Asia* (Cambridge: Cambridge University Press, 1994). See also Silvio A. Bedini, “Holy Smoke: The Oriental Fire Clocks,” *New Scientist*, February 27, 1964, 537–39. I would like to thank Mr. Bedini of the Smithsonian Institution for bringing his article to my attention. Incense clocks in China went back to at least the sixth century, and there is a stone example in the Shōsōin. Edward H. Schafer suggests they originated among Buddhist monks, perhaps in India. *The Golden Peaches of Samarkand: A Study of T'ang Exotics* (Berkeley and Los Angeles: University of California Press, 1963), 160–61.

57. Xu Wenlin and Li Wenguang, “Qingdai jishiyong de ‘shui louhu’” (Clepsydras of the Qing dynasty), *Wenwu cankao ziliao* 1958, no. 7: 39–40.

58. *Huangchao liqi tu shi* (Illustrated regulations for ceremonial paraphernalia of the Qing dynasty) (Taipei: Shangwu yinshuguan, 1978), *juan* 3, 76a–77b.

59. Pasquale M. D’Elia, S.J., ed., *Fonti Ricciane: Documenti Originali Concerenti Matteo Ricci e la Storia delle Prime Relazioni tra l’Europa e la Cina. 1579–1615*, 3 vols. (Rome: La Libreria dello Stato, 1949), 1:33: “Delle arti meccaniche di questra terra,” translation from Forte, *Mingtang and Buddhist Utopias*, 1. The “odoriferous fibres” to which Ricci refers are incense sticks.

60. Alfred Chapuis, *Rélations de l’Horlogerie Suisse avec la Chine: La Montre “Chinoise”* (Neuchâtel: Attinger Frères, 1919), 15; though the exact source is not given, it is likely that Chapuis is quoting from Jan Nieuhof, *L’ambassade de la Compagnie Orientale des Provinces Unies vers l’Empereur de la Chine, ou Grand Cam de Tartarie, Faite par les Srs. Pierre de Goyer & Jacob de Keyser . . .* (Leyden: Jacob de Meurs, 1665).

61. Mathieu Planchon, *L’Horloge; Son Histoire Rétrospective, Pittoresque et Artistique* (Paris: Librairie Remouard, 1898), 262.

62. A. Lübke, “Altchinesische Uhren,” *Deutsche Uhrmacherzeitung* 55 (1931): 197, and “Chinesische Zeitmesskunde,” *Naturw. Kultur* 28 (1931): 45, as cited in Needham, *Science and Civilisation*, vol. 2, pt. 2, p. 545.

63. This is treated by Landes in the sections “A Magnificent Dead End” and “Why Are the Memorials Late?” (DL).

64. On the development of Chinese science in relation to that of Europe refer to Joseph Needham, “Time and Eastern Man,” in *The Grand Titration: Science and Society in East and West* (London: George Allen and Unwin, 1969), 218–98; Nathan Sivin, “Chinese Conceptions of Time,” *Earlham Review* 1 (1966): 82–91, and “Why the Scientific Revolution Did Not Take Place in China—or Didn’t It?” *Chinese Science* 5 (June 1982): 45–66; and David Mungello, “On the Significance of the Question, ‘Did China Have Science?’” *Philosophy East and West* 22 (1972): 467–78.

65. Forte, *Mingtang and Buddhist Utopias*, 259.

66. The link of the clock’s decline to the decline of Buddhism does not explain Su Song’s invention of the late eleventh century within a neo-Confucian environment. Su Song himself was a Confucianist.

67. Forte, *Mingtang and Buddhist Utopias*, 260.

68. The Jesuits also introduced the mechanical clock to Japan during this time. In 1549, Francis Xavier arrived at Kagoshima with two other missionaries. A few years later, in 1550, he presented a clock to the governor of Yamaguchi, Yoshitaka Ouchi. The most famous of these first European clocks in Japan was the one made in Madrid in 1581, which was presented by one of the Jesuits to Tokugawa Ieyasu. Later, a Japan-

ese delegation to Rome in 1583 that went with gifts of Japanese art returned in 1591 with presents from Europe that most likely included clocks, as one of the missionaries presented Hideyoshi with one. As in China, there were Jesuits working at the court: Joan Rodriguez was clockmaker to Hideyoshi and Ieyasu. N. Mody, *The Japanese Clock* (Rutland, Vt.: Charles E. Tuttle, 1967), 19–20. Rodriguez was above all an interpreter: see Michael Cooper, *Rodrigues the Interpreter: An Early Jesuit in China and Japan* (New York: Weatherhill, 1974).

69. Morohashi Tetsuji, ed., *Dai kanwa jiten*, Shukushaban ed. (Tokyo: Taishukan shoten, 1968), 9769 (9:415).

70. *Xuwen xiantong kao* (Comprehensive study of the history of civilization), in *Qinding su tong kao* (n.p.: Zhejiang shuju, 1887), *juan* 29, 11a. This passage may be found in Morohashi, *Dai kanwa jiten*.

71. *Pengchuang xulu*, cited in Morohashi, *Dai kanwa jiten*. D'Elia, *Fonti Ricciane*, 1:35, mentions that Ricci presented fans to the Chinese.

72. *Huangchao liqi tu shi*, *juan* 3, 78a–b, 79a. This illustrated clock, interestingly, is remarkably similar to a chiming clock constructed in the palace during the Jiajing period (1796–1820), now on view in the Hall of Mutual Ease (Jiaotaidian) in the Forbidden City. See fig. 7.

73. *Xiaoting xulu* (Continuation of the records of the whistling pavilion) (Taipei: Wenhai chubanshe, 1966), *juan* 2, 20b, pp. 1046–47.

74. *Oxford English Dictionary*, prepared by J. A. Simpson and E. S. C. Weiner (Oxford: Clarendon Press, 1989).

75. Bruton, *Clocks and Watches*, 7.

76. Bruton, *Clocks and Watches*, 8.

77. Some languages make no distinction made between clocks and watches. In German, for example, both are *Uhr* (pl. *Uhren*).

78. In northern India, a type of clepsydra was used as early as the seventh century at the Buddhist monastery complex of Nālandā, as reported by the Chinese pilgrim Yijing. Takakusu Junijiro, trans., *Record of the Buddhist Religion as Practised in India and the Malay Archipelago* (A.D. 671–95) by I-tsing (London: Clarendon Press, 1896; rpt. Delhi: Munishiram Manoharlal, 1966), 144–45.

79. Bruton, *Clocks and Watches*, 23.

80. Bruton, *Clocks and Watches*, 7.

81. *OED*.

82. An extensive explanation of the Chinese horary system is given in Needham, Wang, and Price, *Heavenly Clockwork*, 199–205.

83. Needham, Wang, and Price, *Heavenly Clockwork*, 165 n. 6.

84. Thomas Michie, “Timepieces,” in *Decorative Arts and Household Furnishings in America, 1650–1920: An Annotated Bibliography*, ed. Kenneth L. Ames and Gerald W. R. Ward (Winterthur, Del.: Henry Francis du Pont Winterthur Museum, 1989), 286.

85. Michie, “Timepieces,” 286.

86. Ann Gorman Condon, “The Celestial World of Jonathan Odell: Symbolic Unities within a Disparate Artifact Collection,” in *Living in a Material World: Canadian and American Approaches to Material Culture*, ed. Gerald L. Pocius (St. John's, Newfoundland: Institute of Social and Economic Research, Memorial University, 1991), 95.

87. The term *material culture* was first used as early as 1875 by A. Lane-Fox Pitt-Rivers. In Canada, the term *material history* is gaining popularity; however, *material culture* still is the most commonly used term (Thomas J. Schlereth, “Material Culture

or Material Life: Discipline or Field? Theory or Method?” in Pocius, *Living in Material World*, 232).

88. Thomas J. Schlereth, *Material Culture Studies in America* (Nashville: American Association for State and Local History, 1982), 1–2.

89. Schlereth, *Material Culture Studies*, 2.

90. Quoted in Susan M. Pearce, “Museum Studies in Material Culture,” in *Museum Studies in Material Culture*, ed. Susan M. Pearce (London: Leicester University Press, 1989), 2.

91. Pearce, “Museum Studies,” 2.

92. With regard to using artifacts in research, Gaynor Cavanaugh states, “The value of material culture studies would appear to be self-evident to those already working in this sphere” (“Objects as Evidence, or Not?” in Pearce, *Museum Studies*, 127).

93. Cavanaugh, “Objects as Evidence,” 126.

94. For example, the eighteenth-century Chinese text *Huangchao liqi tu shi* provides descriptions and basic illustrations of the twelve-symbol imperial court robes worn exclusively by the emperor (*huangdi longpao*; *juan* 4, 21a–b). The text, however, does not indicate the actual placement of the symbols; this information is available only from the actual robes themselves.

95. David Lowenthal, *The Past Is a Foreign Country* (Cambridge: Cambridge University Press, 1985), 214–16.

96. These are cultural choices as opposed to functional choices (Susan M. Pearce, “Objects in Structures,” in *Museum Studies*, 57).

97. Chandra Mukerji, *From Graven Images: Patterns of Modern Materialism* (New York: Columbia University Press, 1983), 15, cited in Craig Clunas, *Superfluous Things: Material Culture and Social Status in Early Modern China* (Urbana: University of Illinois Press, 1991), 2.

98. Lowenthal, *Past Is Foreign Country*, xxiii and 243.

99. Condon, “Celestial World of Odell,” 96.

100. Thomas J. Schlereth, “Material Culture Research and North American Social History,” in Pearce, *Museum Studies*, 22.

101. Maurice and Mayr, *The Clockwork Universe*, ix.

Chapter 1

1. Their writings included works on the history, geography, agriculture, the arts, language, and religion of the Chinese, in addition to translations of the Chinese classics. David E. Mungello, in *Curious Land: Jesuit Accommodation and the Origin of Sinology* (Stuttgart: Franz Steiner, 1985), discusses the importance of these publications and their impact on Sinology. See also Paul A. Rule, “Jesuit Sources,” in *Essays on the Sources for Chinese History*, ed. Donald D. Leslie, Colin Mackerras, and Wang Gungwu (Columbia: University of South Carolina Press, 1975), 176–87.

2. The college was a private school for boys, and Ignatius and Xavier were teachers there, while taking courses elsewhere.

3. Xavier was canonized, along with Ignatius Loyola, in 1622. Jean de Lacouture, *Jésuites*, vol. 1: *Les Conquérants* (Paris: Editions du Seuil, 1991), 495.

4. Donald F. Lach, *Asia in the Making of Europe* (Chicago: University of Chicago Press, 1965), vol. 1, bk. 1, pp. 245–46.

5. Kenneth Scott Latourette, *A History of Christian Missions in China* (New York: Macmillan, 1929), 81.

6. Over the thirty years following Xavier's death, other missionaries spent short periods, from eight days to two months, either at Macao or on Shangchuan, and did not enter the rest of China. It was during this time, in 1565, that Francisco Pérez (1514–83) and Manuel Teixeira (1536–90) set up the Jesuit residence at Macao. This residence later became a college. The church of St. Paul's was built near it but burned to the ground in 1601; a second church was built on the site in 1602. With the expulsion of the Order from Macao by the king of Portugal in 1759, the church and college were handed over to the Senate of Macao. The college was later converted into a barracks. In 1835 the church was burned to the ground, and only the facade was saved (LP, 10). This facade still stands.

7. Andrew C. Ross, "Alessandro Valignano: The Jesuits and Culture in the East," in *The Jesuits: Cultures, Sciences, and the Arts, 1540–1773*, ed. John W. O'Malley, S.J., Gauvin Alexander Bailey, Steven J. Harris, and T. Frank Kennedy, S.J. (Toronto: University of Toronto Press, 1999), 336–51.

8. LP, 17.

9. Lach, *Asia*, vol. 1, bk. 1, pp. 234–45.

10. This method was not unknown to the Christian missionaries. They had used similar methods in the early days of the church. The church realized that in order best to promote Christianity in the Roman world, they would have to integrate it with existing Roman society. The vocabulary, festivals, and rites were all based on the pagan context. In this way, the uninitiated were gradually (and comfortably) drawn into the Christian milieu and then introduced to the more abstract concepts of the church. George Harold Dunne, *Generation of Giants: The Story of the Jesuits in China in the Last Decades of the Ming Dynasty* (Notre Dame, Ind.: University of Notre Dame Press, 1962), 6, 12.

11. For a discussion of these elements and their role in defining Jesuit corporate culture, see Nicolas Standaert, S.J., "Jesuit Corporate Culture as Shaped by the Chinese," in O'Malley et al., *The Jesuits*, 352–63.

12. For details of this expedition see MR.

13. Qiong Zhang has examined Ricci's method of cultural accommodation in "Translation as Cultural Reform: Jesuit Scholastic Psychology in the Transformation of the Confucian Discourse on Human Nature," in O'Malley et al., *The Jesuits*, 364–79, and "Cultural Accommodation or Intellectual Colonization? A Reinterpretation of the Jesuit Approach to Confucianism," Ph.D. diss., Harvard University, 1996.

14. Klaus Maurice, "Propagatio fidei per scientias: Jesuit Gifts to the Chinese Court," in Maurice and Mayr, *The Clockwork Universe*, 31.

15. This is a summarized look at a highly complex situation.

16. One of the main controversies of the seventeenth century was between the long-held Aristotelian-Ptolemaic worldview, with the earth at the center of the universe, and the heliocentric universe of Copernicus. Galileo, whose discoveries corroborated the heliocentric view, had been for twenty years good friends with the Jesuit Christoph Clavius (Klau, 1537–1612), the eminent mathematician who oversaw the final reform of the Gregorian calendar. Clavius was at the famous Collegium Romanum and had taught Ricci. Clavius was also one of Galileo's strongest supporters, especially when Galileo publicly denounced the Aristotelian-Ptolemaic view. Although Clavius himself was not ready fully to accept Galileo's theories, he did support Galileo in his work. Unfortunately, with Clavius's death in 1612, Galileo lost his

most important ally; shortly thereafter, the church denounced Galileo's theories; and he was publicly condemned in 1633.

These rulings were enormously restrictive for the Jesuits, who were well aware of Galileo's findings. Ordered not to expound the theory on heliocentrism (although they found that it made more and more sense in explaining natural phenomena), they instead compromised by telling the Chinese of the work of the Danish astronomer Tycho Brahe (1546–1601), who supported the Ptolemaic view of the sun circling the earth but had the other planets circle the sun. There were obvious limitations to this theory, and the Jesuits used the controversial ideas of Copernicus on occasion. It was not until 1670, however, that the Jesuits openly taught the Copernican model to the Chinese (Mungello, *Curious Land*, 26–27). It has been only recently (1992) that the Catholic Church acknowledged that Galileo's theories were correct.

17. An important, but little studied scientific mission, was that to the king of Siam in 1685. Six French missionaries joined the group as members of the Académie, on behalf of the king of France. For an examination of the Jesuit contribution to this voyage, see Florence Hsia, "Jesuits, Jupiter's Satellites, and the Académie Royale des Sciences," in O'Malley et al., *The Jesuits*, 241–57.

18. MR, 369.

19. Jean Baptiste Du Halde, *A Description of the Empire of China and Chinese-Tartary, Together with the Kingdoms of Korea, and Tibet: Containing the Geography and History (Natural as well as Civil) of those Countries. Enrich'd with General and Particular Maps, and Adorned with a Great Number of Cuts. From the French of P. J. B. Du Halde, Jesuit: with Notes Geographical, Historical, and Critical; and Other Improvements, particularly in the Maps, By the Translator*, vol. 1 (London: T. Gardner for Edward Cave, 1738) and vol. 2 (London: Edward Cave, 1741), 2:127.

20. LP, 111–12.

21. Maurice, "Propagatio fidei per scientias," 32.

22. Ferdinand was himself educated by the Jesuits.

23. Chapuis and Droz, *Automata*, 79–80.

24. Maurice, "Propagatio fidei per scientias," 34. This piece is illustrated in Chapuis and Gélis, *Le Monde des Automates*, 2:201–2; and in Maurice, figs. 10 and 11.

25. Chapuis and Droz, *Automata*, 82.

26. Chrétien Dehaisnes, *Vie du P. Nicolas Trigault* (Douai, 1864), cited in LP, 113.

27. MR, 22–23.

28. Latourette, *Christian Missions in China*, 121; and Bernward H. Willeke, *Imperial Government and Catholic Missions in China during the Years 1784–1785* (St. Bonaventure, New York: Franciscan Institute, 1948), 7. There were four churches in which the missionaries were allowed to reside, two of which were established prior to this edict. In 1653, Lodovico Buglio set up the Dongtang, or Eastern Church, located in Dongtangzi Hutong or Ganyu Hutun (Hutong). It came to be known as the Lesser Portuguese Church at the end of the Qianlong period. The Nantang, or Southern Church, was established in 1650 by Adam Schall von Bell. Also known at the time as the German Convent, it was located to the east of the Xuanwu Gate. At the end of the Qianlong period, it was known as the Greater Portuguese Church. The Beitang, or Northern Church, also known as the French Convent, was dedicated in 1703 and built by the French Jesuits under Gerbillon. Known for its fine library, it was located outside Xi'an men. The Xitang, or Western Church, also called the Italian Convent or the Church of the Propaganda, was established under Pedrini in 1723 and was located on the main thoroughfare of Xizhi men. Of this church, Matteo Ripa noted in his mem-

oirs that early in 1722, he and the other Italian Jesuits had been staying at the imperial residence known as the Changchunyuan, approximately two hours' journey from Beijing. These Jesuits were ordered to stay in Beijing with the French or Portuguese Jesuits, a situation that prompted Ripa "to seize the opportunity, and attempt to establish a house in Peking for the use of the missionaries sent by the Propaganda." Matteo Ripa, *Memoirs of Father Ripa, During Thirteen Years' Residence at the Court of Peking in the Service of the Emperor of China; with an Account of the Founding of the College for the Education of Young Chinese at Naples*, trans. Fortunato Prandi (London: John Murray, 1844), 118. For more information on these churches, see Fu Lo-shu, *A Documentary Chronicle of Sino-Western Relations (1644–1820)*, Association for Asian Studies Monograph no. 22 (Tucson: University of Arizona Press, 1966), 2:591 n. 24; W. Devine, *The Four Churches of Peking* (London, 1930); and *Lettres Edifiantes et Curieuses, Ecrites des Missions Etrangères, Par Quelques Missionnaires de la Compagnie de Jésus*, 30 vols. (Paris: Chez Nicolas LeClerc, Rue Saint Jacques proche Saint Yves, a l'Image Saint Lambert, 1708–44), 9:377.

The Yongzheng emperor, in an edict of 1724 prohibiting Christianity, forced the missionaries to leave their churches. This had more effect on the provincial churches, as the missionaries who served at the court as mathematicians, astronomers, and artists were spared (Willeke, *Imperial Government*, 10).

29. "The Court: Source of Support and Challenge," in Maurice and Mayr, *The Clockwork Universe*, 212.

30. Mayr, "Mechanical Symbol," 1.

31. Bonaventure, *Retracing the Arts to Theology or Sacred Theology, the Mistress among the Sciences*, reproduced in translation in *Philosophy in the Middle Ages*, ed. Arthur Hyman and James J. Walsh (Indianapolis: Hackett, 1983), 466.

32. Condensed from sections 13 and 14 of Bonaventure, *Retracing Arts to Theology*.

33. These notions were expounded by Nicolaus Cusanus (1401–64) in his *De Visione Dei* (The vision of God) of 1458.

34. See Maurice and Mayr, *The Clockwork Universe*, 17, fig. 6, for an illustration of the second Strasbourg clock.

35. The Chinese also used incense clocks, as Ricci was aware. He had mentioned in his diary the water clocks, but also those that used "the fire of certain perfumed fibres made all of the same size." In the same passage, Ricci tells of sand clocks, and all of these were considered "very imperfect" (D'Elia, *Fonti Ricciane*, 1:33). On the history and use of incense clocks in the Far East, see Bedini's *The Trail of Time*.

36. See the first chapter of DL.

37. Xu most likely would have learned something about clock making from his association with Ricci.

38. L. Carrington Goodrich and Chaoying Fang, eds., *Dictionary of Ming Biography*, 2 vols. (New York: Columbia University Press, 1976), 1:2–5.

39. Needham, Wang, and Price, *Heavenly Clockwork*, 145.

40. Needham, Wang, and Price, *Heavenly Clockwork*, 146–47.

41. MR, 373.

42. MR, 373–74.

43. MR, 373, 392, and 536.

44. Needham, Wang, and Price, *Heavenly Clockwork*, 148.

45. Needham, *Science and Civilisation*, vol. 4, pt. 2, p. 532. All clockmakers belonged to a guild. All guild members were required to participate in religious ceremonies associated with their particular guild. These ceremonies were often designed as

worship of the guild's founder, which may explain the "deification" of Ricci, as he was the first to introduce Western clock making to the Chinese court. Guilds will be discussed in greater detail below.

46. Craig Clunas, "Ming and Qing Ivories: Useful and Ornamental Pieces," in *Chinese Ivories from the Shang to the Qing*, ed. William Watson (London: Oriental Ceramic Society by British Museum Publications, 1984), 121.

47. Zhang Tangrong, *Qinggong shuwen* (Detailed account of the Qing imperial palace) (Taipei: Wenhai chubanshe, 1969), 316–18.

48. Located just north of the Riqing Gate and south of the Duanningdian, this complex is shown on the detailed map found in Wan Yi, Wang Shuqing, and Lu Yanzheng, *Qingdai gongting shenghuo* (accompanying English title: *Life in the Forbidden City*) (Xianggang: Shangwu yinshu guan, 1985), fig. 70. See also Gugong bowuyuan gujian guanlibu, ed., *Cijincheng gongdianjian zhuzhuangshi: Neiyuan zhuangxiu tudian* (Illustrated catalog of the architecture and decoration of the imperial palace: Interior design) (Beijing: Cijincheng chubanshe, 1995), 10.

49. Yang Boda, *Qingdai Guangdong gongpin* (Tribute from Guangdong in the Qing dynasty) (Beijing: Gugong bowuyuan and Xianggang: Zhongwen daxue wenwuguan, 1987), 63, 64.

50. Yang Boda, *Qingdai Guangdong gongpin*, 64.

51. John Bell, *A Journey from St Petersburg to Peking, 1719–22*, ed. J. L. Stevenson, from the 1763 edition (Edinburgh: University Press, 1965), 137–38.

52. Volume titled "Zuozhongchu zhongbiao xishu qingce" (Accurate list of the detailed count of clocks of the Office of Clock Manufacture) from the "Yuanmingyuan chengnei zuozhongchu zhongbiaodeng xiang qingce" (Accurate list of the clocks, watches, etc., of the Yuanmingyuan and Inner City Office of Clock Manufacture), archival document no. 404 (Guangxu 5/12/20), Number One Historical Archives, Beijing.

53. The Qianqinggong came under the supervision of Liu Yu and Pan Feng; Liu Cangzhou managed the Yangxindian; and Li Yutong and Zha De managed the workshop at the Yuanmingyuan.

54. *Qinding da Qing huidian*, juan 98, cited in Liu Yuefang, "Qinggong zuozhongchu" (The Office of Clock Manufacture of the Qing palace), *Gugong bowuyuan yuankan* 1989, no. 4: 49.

55. Jonathan Spence, *Emperor of China: Self-Portrait of K'ang-hsi* (New York: Knopf, 1974; rpt. New York: Vintage, 1988), 72–73; and *Qinding da Qing huidian*, juan 98, cited in Liu Yuefang, "Qinggong zuozhongchu," 49.

56. Neiwufu zaobanchu (Office of Manufacture of the Imperial Household Department), archival documents nos. 1871–1912, Number One Historical Archives, Beijing.

57. Letter of November 4, 1773. Benoît writes, "I was ordered to take Father Panzi to the palace tomorrow to do what His Majesty tells him to. Consequently, on January 19, I took this painter to the Ki-siang-kong (it is the place within the palace where the Chinese painters work during the three months the emperor stays at Beijing)" (*LEC*, 24:286).

58. "Yuanmingyuan chengnei zuozhongchu zhongbiaodeng xiang qingce," archival documents nos. 392–413.

59. Neiwufu zaobanchu, archival document no. 1871 (QL 21/11/10), Number One Historical Archives, Beijing.

60. These two multivolume works are *LEC* and *Lettres Edifiantes et Curieuses* (LeClerc).

61. Amiot letter of 1754, in *LEC*, 23:362.

62. Jacques Philibert Rousselot de Surgy, *Memoires Géographiques, Physiques et Historiques. Sur l'Asie, l'Afrique, & l'Amerique. Tirés des Lettres Edifiantes, & des Voyages des Missionnaires Jésuites*, 4 vols. (Paris: Durand, 1767), 2:271–74. This letter, with slight changes as indicated by the square brackets, is found in *LEC*, 23:176–78. This letter was also published in *Lettres Edifiantes et Curieuses* (LeClerc), vol. 28 (1758), in which the date of the event is given incorrectly as January 6, 1750.

63. *LEC*, 23:178.

64. It was not just the sciences but the arts, as well, that proved to be useful. The Order also sent missionaries who were able in the arts as well. See, for example, Cécile Beurdeley and Michel Beurdeley, *Castiglione: Peintre Jésuite à la Cour de Chine* (Fribourg: Office du Livre, 1971); George Loehr, “Missionary Artists at the Manchu Court,” *Transactions of the Oriental Ceramic Society* 34 (1962–63): 51–57; George Loehr, “European Artists at the Chinese Court,” in *The Westward Influence of the Chinese Arts from the Fourteenth to the Eighteenth Century*, ed. William Watson (London: Percival David Foundation of Chinese Art, 1972), 33–42; John E. McCall, “Early Jesuit Art in the Far East,” *Artibus Asiae* 11 (1948): 45–69; Paul Pelliot, “La Peinture et la Gravure Européennes en Chine au Temps de Matthieu Ricci,” *T'oung Pao* 20 (1921): 183–274; and Michael Sullivan, *The Meeting of Eastern and Western Art from the Sixteenth Century to the Present Day*, 2d ed. (Berkeley and Los Angeles: University of California Press, 1989).

65. Bell, *Journey from St Petersburg*, 151, entry for December 16, 1720. He mentions visiting Fathers Fridelly (Xavier-Ehrenbert Fridelli, 1673–1743, a mapmaker) and Keagler (Ignace Kögler, 1680–1746, mathematician and astronomer): “Both these fathers, and several other ecclesiasticks of inferior rank in this convent, are Germans. One of the fathers was a clock-maker.” Apparently he is referring to Stadlin (1658–1740), a Swiss, whom Bell later calls an “old German.”

66. Fu Lo-shu, *Documentary Chronicle*, 5.

67. Under the reign of the Shunzhi emperor, Western methods of astronomy were adopted by imperial edict in 1644 (Fu Lo-shu, *Documentary Chronicle*, 3–4).

68. However, although Shunzhi's policies lasted for four years after his death in 1661, under the rule of the Kangxi emperor, Schall was persecuted and sentenced to death. He was cleared, but conditions for the missionaries did not improve until 1667, when the Kangxi emperor himself gained control (Willeke, *Imperial Government*, 6).

69. *LEC*, 23:364.

70. *Lettres Edifiantes et Curieuses* (LeClerc), 8:88.

71. *LEC*, 24:110.

72. *LEC*, 22:518.

73. For a full account and analysis of the conflicts and controversies concerning the Jesuits in China, see Andrew C. Ross, *A Vision Betrayed: The Jesuits in Japan and China, 1542–1742* (Edinburgh: Edinburgh University Press, 1994).

74. Ripa, *Memoirs of Father Ripa*, 127–28.

75. Ripa, *Memoirs of Father Ripa*, 128–29.

76. Less is known of the Chinese clockmakers, who will be considered in the following chapter.

77. Georges Bonnant, in “The Introduction of Western Horology in China,” *La Suisse Horlogère*, international edition, 1 (1960): 31, attributes this information to a let-

ter written by Chalier as published by Paul Pelliot in “Bulletin Critique,” review of *Rérelations de l’Horlogerie Suisse avec la Chine: La Montre “Chinoise,”* by Alfred Chapuis, *T’oung Pao* 20 (1921): 64. I am unable to find this passage in this letter; it certainly is not to be found on page 64.

78. Bonnant, “Western Horology in China,” 31.

79. As published in Yang Boda, *Qingdai Guangdong gongpin*.

80. The presence of Jesuit clockmakers at the Chinese court from 1601 to 1822 is shown in Appendix B.

81. Latourette, *Christian Missions in China*, 169–70.

82. Henri Cordier, “Les Corespondants de Bertin,” *T’oung Pao* 14 (1913): 228.

83. Willeke, *Imperial Government*, 15.

84. Willeke, *Imperial Government*, 15; and Latourette, *Christian Missions in China*, 166–67.

85. Earl H. Pritchard, “Letters from Missionaries at Peking Relating to the Macartney Embassy (1793–1803),” *T’oung Pao* 31 (1935): 5 n. 1.

86. The first Lazarists were sent to China by the Propaganda in 1697 (Latourette, *Christian Missions in China*, 127).

87. Latourette, *Christian Missions in China*, 168.

88. Raux was the successor to Father François Bourgeois (1723–92) in Beijing. Upon the arrival in Beijing of Raux and the other Lazarists in 1785, Bourgeois wrote, “M. Raux . . . is a man of true merit. . . . One does not know if it is he who lives as a Jesuit or we who live as Lazarists. The fact is that the house goes on as before, and that the world is content.” In 1786, Bourgeois wrote: “M. Raux, my successor, . . . is young, full of talent, fire, zeal, piety, and health” (cited in LP, 944).

89. Latourette, *Christian Missions in China*, 169.

90. For a full biography of Ricci, see the entry by Wolfgang Franke in Goodrich and Fang, *Dictionary of Ming Biography*, 1137–44.

91. This site, known as “Chala” (Zhalaner), was taken over by the Lazarists in 1785 and was transferred to the Marist brothers in the nineteenth century. During the Boxer uprising, the area was heavily damaged. It was later restored, only to suffer damage again in 1966. Jean-Marie Planchet, *Le Cimetière et les Oeuvres Catholiques de Chala, 1610–1927* (Beijing: Imprimerie des Lazaristes, 1928); and Franke, 1144.

92. See also D’Elia, *Fonti Ricciane*; Vincent Cronin, *The Wise Man from the West* (London: Fount Paperbacks, 1984); Lin Jinshui, “Li Madou zai Zhongguo de huodong yu yingxiang” (The activities and influence of Matteo Ricci in China), *Lishi yanjiu* 1, issue 163 (1983): 25–36; and Spence, *Memory Palace*.

93. LP, 104.

94. This is also found as part of another work, the *Nongzheng quanshu* (Treasures of agriculture) by Xu Guangqi, published in 1640.

95. Mungello, *Curious Land*, gives the date of birth as 1610.

96. Magalhães and Buglio were to become close friends, having faced persecution together while attempting to convert the Chinese to Christianity. On one occasion, Magalhães was falsely convicted of the crime of giving presents to a mandarin and was condemned to death by strangulation. However, the sentence was commuted (LP, 253).

97. His experiences in China are recorded in Gabriel de Magalhães, *Nouvelle Relation de la Chine Contenant la Description de Particulitez las Plus Considérables de ce Grand Empire* (Paris, 1690).

98. LP, 253–54.

99. This is mentioned in a letter of Verbiest, May 11, 1684, cited in H. Bernard Maitre, “Ferdinand Verbiest, Continuateur de l’Oeuvre Scientifique d’Adam Schall,” *Monumenta Serica* 5 (1940): 103.

100. *Astronomia Europaea sub Imperatore Tartaro-Sinico Câm-Hy appellato, ex umbra in lucem revocata à R. P. Ferdinando Verbiest Flandro-Belgico e Societate Jesu, Academiae Astronomicae in Regia Pekinensi Praefecto* (Dillingen: Bencard, 1687), 92, section on Horolotechnia, as mentioned in Needham, Wang, and Price, *Heavenly Clockwork*, 148.

101. Cf. Rui Vieira Nery, *A Música no Cialo da “Bibliotheca Lusitana”* (Lisbon: Fundação Calouste Gulbenkian, 1984), 191–92. Pereira was coauthor of *Lülü zhengyi*, 5 vols. (1713), a treatise on musical theory written for the Kangxi emperor. See *Ongaku jiten*, 5 vols. (Tokyo: Heibonsha, 1967–68), 5:3335.

102. LP, 381, cites a letter of Mgr. Lopez, who wrote in 1690 that Pereira arrived in 1674.

103. LP, 382; and Needham, Wang, and Price, *Heavenly Clockwork*, 148.

104. Jean Baptiste Du Halde, *The General History of China. Containing A Geographical, Historical, Chronological, Political and Physical Description of the Empire of China, Chinese-Tartary, Corea and Thibet*, 4 vols. (London: John Watts, 1736), 3:77.

105. LP, 592.

106. Bonnant, “Western Horology in China,” 30.

107. Chapuis, *Rélations de l’Horlogerie Suisse*, 45.

108. LP, 620.

109. Bell, *Journey from St Petersburg*, 151.

110. *Lettres Edifiantes et Curieuses* (LeClerc), 8:88.

111. LP, 655.

112. Bonnant, “Western Horology in China,” 30.

113. Letter from Beijing of November 29, 1721, in which Angelo is presented to the court by Mezzabarba. Soame Jenyns, “Painted (Canton) Enamels on Copper and Gold,” in *Chinese Art II*, by R. Soame Jenyns and William Watson, 2d ed. (New York: Rizzoli, 1980), 144. The map of the cemetery of the Xitang (for missionaries of the Propaganda) shows the grave of an “Ange Burgo, Français.” Alphonse Favier, *Peking, Histoire et Description* (Paris: Desclée de Brouwer, 1902), 175.

114. Bonnant, “Western Horology in China,” 30; and GM, 353.

115. Ripa, *Memoirs of Father Ripa*, 188.

116. Letter of October 17, 1754, *LEC*, 2:362.

117. Needham, Wang, and Price, *Heavenly Clockwork*, 149, quoting from a letter written by Chalier, and published by Pelliot, “Bulletin Critique.”

118. *LEC*, 23:363.

119. Thébault died on January 18, 1766; du Ventavon arrived at Beijing October 18, 1766 (LP, 793, 913).

120. *LEC*, 24:109–10.

121. LP, 793.

122. Letter of Amiot to Bertin, 1774, quoted in Paul Pelliot, “Les ‘Conquêtes de l’Empereur de la Chine,’” *T’oung Pao* 20 (1920): 193.

123. Amiot’s letter of October 17, 1754, in *LEC*, 23:362.

124. *LEC*, 23:164–76.

125. Postscript dated October 12, 1774, of a letter to Bertin of October 1, 1774, quoted in Henri Cordier, “La Supression de la Compagnie de Jésus,” *T’oung Pao* 17 (1916): 298.

126. LP, 872.

127. LP, 890.
128. Extract of a letter to Pere Dervillé, November 7, 1764, *LEC*, 23:442.
129. This manuscript letter is dated October 22, 1767, and is cited by LP, 891.
130. See George R. Loehr, "Peking–Jesuit Missionary–Artist Drawings Sent to Paris in the Eighteenth Century," *Gazette des Beaux Arts*, October 1962, 419–25.
131. *LEC*, 24:110.
132. Extract from an unpublished letter of Bourgeois in the collection of the library of Zi-ka-wei outside Shanghai, cited in LP, 914.
133. This could not be the mechanician Father Sigismond, who will be considered below. He was in Beijing from at least 1754 and died there in 1767; de Ventavon arrived in Beijing in 1766, and this letter was written in 1769.
134. *LEC*, 24:110.
135. Both Manchu and Mongolian use Uighur script.
136. Cordier, "Les Corespondants de Bertin," 239.
137. Letter of Benoît to M. XXX of November 4, 1773, *LEC*, 24:280.
138. Benoît's letter is found in *LEC*, 24:280; Amiot's letter is quoted in Camille de Rochemonteix, S.J., *Joseph Amiot et les Derniers Survivants de la Mission Française de Pékin, 1750–1795* (Paris: Librairie Alphonse Picard et Fils, 1915), 150–51.
139. Favier, *Péking, Histoire et Description*, 175.
140. See Pelliot's editorial comments in Pritchard, "Letters from Missionaries," 4–5.
141. Silvio A. Bedini, "Chinese Mechanical Clocks," *National Association of Watch and Clock Collectors Bulletin* 7, no. 4 (1956): 215.
142. Favier, *Péking, Histoire et Description*, 192; and Willeke, *Imperial Government*, 23 n. 31. Cordier, however, gives Paris's year of arrival as 1788 ("Suppression," 614).
143. Raux's letter of November 17, 1786, cited in Cordier, "Les Corespondants de Bertin," 240.
144. Cordier, "Suppression," 616.
145. Bonnant, "Western Horology in China," 30; and Needham, Wang, and Price, *Heavenly Clockwork*, 150 n. 3.
146. Favier, *Péking, Histoire et Description*, 196.
147. Cordier, "Les Corespondants de Bertin," 227.
148. Cordier, "Les Corespondants de Bertin," 252, 254.
149. Petitpierre is discussed in chapter 2.
150. George [Thomas] Staunton, *Miscellaneous Notices Relating to China, and Our Commercial Intercourse with That Country Including a Few Translations from the Chinese Language*, 2d ed. (London: John Murray, Albemarle Street, 1822), 81.
151. Willeke, *Imperial Government*, 24 n. 33.
152. Staunton, *Miscellaneous Notices*, 81.
153. In their writings, both Macartney and John Barrow, another member of the embassy, refer to him as Deodati.
154. Staunton, *Miscellaneous Notices*, 81. Latourette gives the date incorrectly as 1784, when Adeodati and the others arrived at Macao.
155. Latourette, *Christian Missions in China*, 177; and Planchet, *Cimetière*, 51–52.
156. Pritchard, "Letters from Missionaries," 4 n. 2.
157. Willeke, *Imperial Government*, 23 n. 26; and Fu Lo-shu, *Documentary Chronicle*, 350–54, 572 n. 403. As a result of Adeodato's actions, the Catholics faced additional persecution, including the burning of books and printing blocks.
158. Bonaventure, *Retracing Arts to Theology*, 465. Emphasis in original.
159. Bonaventure, *Retracing Arts to Theology*, 465. Emphasis in original.

Chapter 2

1. MR, 180, 296, 374.
2. *Mémoires Concernant l'Histoire, les Sciences, les Arts, les Moeurs, les Usages, &c. des Chinois: Par les Missionnaires de Pékin*, 16 vols. (Paris: Nyon, 1776–1814), 9:179–80.
3. Beginning with Adam Schall von Bell (1592–1666) in 1644, a succession of Jesuits held the important position of director of the Imperial Board of Astronomy. He was succeeded by Johannes Schreck (1576–1630), followed by Ferdinand Verbiest (1623–88), Thomas Grimaldi (1639–1712), Ignatius Kögler (1680–1746), Augustus von Hallerstein (1703–74), Felix da Rocha (1713–81), Joseph Raux (1754–1801), with the Portuguese P. Serra being the last European to hold the post (Fu Lo-shu, *Documentary Chronicle*, 476, 505; LP). In cartography, the Jesuits undertook to map the empire in 1708, a ten-year project, the result of which was later engraved for printing under the direction of the Jesuit missionary Matteo Ripa (1682–1746). Henri Bernard, S.J., “Les Etapes de la Cartographie Scientifique pour la Chine et les Pays Voisins Depuis le XVIe Jusqu’à la Fin du XVIIIe Siècle,” *Monumenta Serica* 1 (1935): 462.
4. Gao Shiqi, *Pengshan miji* in *Guxue huikan*, 12:1a–4b, cited in Fu Lo-shu, *Documentary Chronicle*, 112–13.
5. Spence, *Emperor of China*, 72–73.
6. Ripa, *Memoirs of Father Ripa*, 118.
7. *Mémoires Concernant l'Histoire*, 9:180.
8. Bell, *Journey from St Petersburg*, 182. Bell, a native of Antemony, Scotland, in 1714 went to Russia, where he worked as a physician. He later secured a place on the Ismailov embassy to China of 1720–22. A good number of the curiosities that Bell collected while in the Far East were given to Sir Hans Sloane for his collections (Bell, 3).
9. *Mémoires Concernant l'Histoire*, 9:180.
10. *Mémoires Concernant l'Histoire*, 9:180.
11. *Mémoires Concernant l'Histoire*, 9:180.
12. Two poems by the Yongzheng emperor are cited in Guo Fuxing, “Zhongguo wenhua zashuo” (Miscellaneous talks on Chinese culture), in *Gongting wenhuan juan* (Beijing: Beijing yanshan chubanshe, 1993), 516.
13. Letter by Chalier dated October 16, 1736, as reproduced in Pelliot, “Bulletin Critique,” 66–67.
14. H-S, 1.
15. On Western astronomical instruments in the Qianlong period, see Tong Yan, Si Tudong, and Yi Shitong, “Ji heng fu chen yi” (An ancient astronomical instrument), *Gugong bowuyuan yuankan* 1987, no. 1: 28–34, 48.
16. Letter of October 17, 1754, *Lettres Edifiantes et Curieuses, Ecrites des Missions Etrangères. Mémoires de la Chine*, new ed. (Paris: Chez J. G. Merigot le Jeune, Librairie, Quai des Augustins, 1771–81), 23:361–62.
17. Wen C. Fong, “Imperial Patronage under the Arts of the Ch’ing,” in *Possessing the Past: Treasures from the National Palace Museum, Taipei*, by Wen C. Fong and James C. Y. Watt (New York: Metropolitan Museum of Art, 1996), 555.
18. Margaret Medley writes that although some sources give the date that the manuscript was offered to the throne as 1759, which coincides with the date of the preface, this is not correct, and she argues convincingly that it could not have appeared earlier than mid-1760. *The Illustrated Regulations for Ceremonial Paraphernalia of the Ch’ing Dynasty* (London: Han-Shan Tang, 1982).

19. *Kangxidi yuzhi wenji* (Literary works of the Kangxi emperor), 4 vols. (Taiwan: Xuesheng shuju, 1966), 2428.
20. Cited in Guo Fuxiang, “Zhongguo wenhua zashuo,” 516.
21. *Qing Gaozong yuzhi shi*, juan 89, as cited in Guo Fuxiang, “Qianlong huangdi yu Qinggong zhongbiao de jianshang he shoucang” (The Qianlong emperor and the enjoyment and collection of Qing palace clocks), *Gugong wenwu yuekan* 13, no. 9 (1995): 77.
22. John Lust, *Western Books on China Published up to 1850 in the Library of the School of Oriental and African Studies, University of London* (London: Bamboo, 1987), vii.
23. Nicholas Trigault, *De Christiana Expeditione Apud Sinas Suscepta ab Societatis Iesu Ex. P. Mattaei Ricij Eiusdem Societatis Comentarijs* (Augsburg, 1615). Ricci’s own writings did not reach publication until much later, when they were edited by Pasquale D’Elia in *Fonti Ricciane* in 1942.
24. Semedo, a Portuguese who entered the novitiate at seventeen, in 1613 arrived in Nanjing, where he studied the Chinese language. He returned to Europe, arriving there in 1640. In 1644, he again left for China, where he passed away in Canton in 1658 (LP, 143–47).
25. See Lust, *Western Books on China*, entries 71–75.
26. Semedo, *That Great Renowned Monarchy*, 183.
27. Athanasius Kircher, *China Monumentis, qua Sacris qua Profanis, nec non Variis Naturae & Artis Spectacularis, Aliarumque rerum Memorabilium Argumentis Illustrata* (Amsterdam: Johannes Jansson van Waesberg, 1667; rpt. Kathmandu, Nepal: Ratna Pustak Bhandar, 1979), 59.
28. Du Halde, *Empire of China*, 2:127.
29. Sir George [Leonard] Staunton, *An Historical Account of the Embassy to the Emperor of China, Undertaken by Order of The King of Great Britain; Including the Manners and Customs of the Inhabitants; and Preceded by An Account of the Causes of The Embassy and Voyage to China* (London: John Stockdale, Piccadilly, 1797), 380–81.
30. This list was compiled from *An Embassy to China*, 353; and John E. Wills Jr., *Embassies and Illusions: Dutch and Portuguese Envoys to K’ang-hsi, 1667–1687* (Cambridge: Council on East Asian Studies, Harvard University, 1984).
31. The Ismailov embassy also carried with it “clocks [and] repeating watches set in diamonds,” as presents from the czar to the Qianlong emperor (Bell, *Journey from St Petersburg*, 137).
32. The majority of their presents consisted of cottons, woolens, and spices, although the Van Hoorn embassy carried a globe and a celestial sphere and the Paats embassy brought three telescopes and one clock (Wills, *Embassies and Illusions*, appendix E).
33. Ultimately, the embassy was unsuccessful. It is also known for the famous “kowtow incident” in which Macartney refused to perform the ritual for the emperor. Pritchard, “Letters from Missionaries,” discusses this with reference to letters by the missionaries in an effort to reconcile the differing accounts of the event by the British and the Chinese.
34. These include John Barrow, *Travels in China, Containing Descriptions, Observations, and Comparisons, Made and Collected in the course of a Short Residence at the Imperial Palace of Yuen-Ming-Yuen, and on a Subsequent Journey Through the Country from Peking to Canton* (London: T. Cadell and W. Davis, 1804; Philadelphia W. F. M’Laughlin, 1805); John Barrow, *Some Account of the Public Life, and a Selection from*

the Unpublished Writings, of the Earl of Macartney. The Latter Consisting of Extracts from an Account of the Russian Empire; A Sketch of the Political History of Ireland: and a Journal of an Embassy from the King of Great Britain to the Emperor of China (London: T. Cadell and W. Davies, 1807); Aenaes Anderson, *A Narrative of the British Embassy to China, in the Years 1792, 1793, and 1794; Containing the Various Circumstances of the Embassy; with Accounts of the Customs and Manners of the Chinese; and a Description of the Country Towns, Cities, etc. etc.* (London: J. DeBrett, 1795); Samuel Holmes, *The Journal of Mr. Samuel Homes, Sarjeant-Major of the XIth Light Dragoons, During his Attendance, as one of the Guard on Lord Macartney's Embassy to China and Tartary, 1792–3* (London: W. Bulmer, 1798); and John Christian Hüttner, *Voyage à la Chine; Par J. C. Hüttner, Gentilhomme d'Ambassade* (Paris: J. J. Fuchs, 1799).

35. The emperor's birthday actually fell on September 21, 1790; by the time of Macartney's visit, the emperor was already eighty-three years old.

36. These presents were referred to as "gifts" by the king of England, and by the Chinese as "tribute gifts," suggesting that to the Chinese court, King George III of England was on a level similar to the vassals of China. Sven Hedin, *Jehol: City of Emperors* (London: Kegan Paul, Trench, Trubner, 1932), 195. See also the chapter entitled "Gifts or Tribute?" in Alain Peyrefitte, *The Immobile Empire*, trans. Jon Rothschild (New York: Knopf, 1992).

37. Wason Collection on China and the Chinese, Cornell University, vol. 4, no. 141, as cited in J. L. Cranmer-Byng and T. H. Levere, "A Case Study in Cultural Collision: Scientific Apparatus in the Macartney Embassy to China, 1793," *Annals of Science* 38 (1981): 508 n. 7.

38. Wason Collection, vol. 8, document 350, fols. 1–2, cited in Cranmer-Byng and Levere, "Study in Cultural Collision," 513–14.

39. Staunton, *Historical Account*, 245–46.

40. On January 25, 1792, Macartney wrote to Francis Baring, chairman of the Court of Directors for the East India Company, concerning the presents from the Cathcart embassy, that "certain of the mathematical and mechanical articles would be suitable if repaired so as to appear quite new. The guns, pistols, . . . and opera glasses would be more suitable if mounted and ornamented with silver. All clocks should be new and undamaged, and the amount of yellow articles should be increased." Earl H. Pritchard, "The Crucial Years of Early Anglo-Chinese Relations, 1750–1800," *Research Studies of the State College of Washington* 4, nos. 3–4 (September–December 1936): 281.

41. GM, 266.

42. Pritchard, "Crucial Years," 291.

43. In a letter to Macartney, Dinwiddie wrote that his duties included "The erecting and regulating the planetarium; the constructing, filling and ascending in the balloon; descending in the diving bell; together with experiments on electricity, mechanics, and other branches of experimental philosophy; astronomical and other calculations." William Jardine Proudfoot, *Biographical Memoir of James Dinwiddie* (Liverpool, 1868), 27, cited by Cranmer-Byng in GM, 310.

44. Pritchard, "Crucial Years," 293.

45. Petitpierre (1769–ca. 1810) came to London from Switzerland and was offered a place with the embassy after Macartney heard of his skill. When the embassy left Beijing for Macao to return to England, Petitpierre stayed on and joined the Titsingh embassy. He later worked for Beale and Co., of Guangzhou, which sold European-made clocks and automata. From Guangzhou, he moved first to Manila and then to Batavia, where he married a Javanese. Sometime later, the ship on which he was trav-

eling in southeast Asia was attacked by Malay pirates, and Petitpierre was killed. Alfred Chapuis, *Rérelations de l'Horlogerie Suisse avec la China: La Montre "Chinoise"* (Neuchâtel: Attinger Frères, 1919), 45–50.

46. In a letter of January 28, 1792, Macartney expressed his intention to bring with him to China new inventions such as a model steam engine, a spinning Jenny, Smee-ton's pulleys, balloons, Bromah's patent locks, a rolling and a printing press, and a set of globes (Pritchard, "Crucial Years," 282).

47. The value of the gifts was £13,124 for goods purchased in London for the embassy, £2,486 for the gifts from the previous Cathcart embassy, and £342 for presents for the viceroy. Of these gifts, the "curiosities" were valued at £420, the planetarium at £1,438, the globes at £971, the lustres at £949, and the telescope at £180 (Pritchard, "Crucial Years," 305–6). These figures differ somewhat from Pritchard's later article, in which he reports that the presents from the Cathcart embassy were valued at £2,394, and the total cost of the presents, including those to the Viceroy, was £15,953. The value of the presents that were returned to the commissioners at Guangzhou at the end of the embassy was £4,333. Earl H. Pritchard, "The Instructions of the East India Company to Lord Macartney on His Embassy to China and His Reports to the Company, 1792–4," *Journal of the Royal Asiatic Society*, pt. 1, "Instructions from the Company," July 1938, 201–30, pt. 2, "Letter to the Viceroy and First Report," July 1938, 375–96, pt. 3, "Later Reports and a Statement of the Cost of the Embassy," October 1938, 508–9. Hedin gives the value of the gifts at £13,123 12s. 4d. (*Jehol*, 201n. 1). For the Cathcart embassy, British goods were selected as gifts in an effort to stimulate the market in China for them. The embassy also wanted to display British skill. A total of £4,045 was spent on these items, including £374 on watches and £175 on chronometers (Pritchard, "Crucial Years," 247).

48. Pritchard, "Instructions," pt. 3, 508–9.

49. GM, 101.

50. Pritchard, "Letters from Missionaries," 19–20, and "Instructions," pt. 2, 394 n.

2. See also the Macartney letter reproduced in "Instructions," pt. 2, 394.

51. Staunton, *Historical Account*, 28.

52. Staunton, *Historical Account*, 31.

53. GM, 75, 79.

54. Staunton, *Historical Account*, 297.

55. GM, 96. This was August 23, 1793.

56. John Barrow (1764–1848) was the comptroller for the embassy and has been described as "an ambitious jack-of-all trades who considered himself something of a mathematician and scientist" (Pritchard, "Crucial Years," 291).

57. By imperial decree, four engineers were allowed to stay at the Yuanmingyuan (Fu Lo-shu, *Documentary Chronicle*, 325).

58. GM, 144. Before leaving China, Macartney gave a gold watch to each of the missionaries: Poirot, Raux, Grammont, and Adeodato. Poirot's and Raux's letters to Macartney, expressing their thanks for the presents, are reproduced in Pritchard, "Letters from Missionaries," 39–45.

59. G. L. Staunton, *An Authentic Account of an Embassy from the King of Great Britain to the Emperor of China, including Cursory Observations made and Information Obtained in Travelling through that Ancient Empire and a Small Part of Chinese Tartary . . . , Taken Chiefly from the Papers of His Excellency, the Earl of MaCartney*, 3 vols. (London: Nicol, 1797), 3:140.

60. GM, 340.

61. See, for such views, Zhang Shunhong, “Historical Anachronism: The Qing Court’s Perception of and Reaction to the Macartney Embassy,” in *Ritual and Diplomacy: The Macartney Mission to China, 1792–94*, ed. Robert A. Bickers (London: British Association for Chinese Studies, 1993), 31–42; and Cranmer-Byng and Levere, “Study in Cultural Collision.”

62. It made no sense, for example, for Macartney to state that once the objects were put together they could not be disassembled. Had these items not once before in England been assembled and then taken apart for shipping to China? The emperor’s observations may be found in the *Zhanggu congbian* (Collected historical documents) (Beijing: Gugong Bowuyuan, 1928–30), 7, 44a–46a. Here, I direct the reader to James Hevia’s article, “The Macartney Embassy in the History of Sino-Western Relations,” in Bickers, *Ritual and Diplomacy*, 57–79, in which he examines the Chinese court’s characterization of the embassy’s gifts and their relation to Manchu kingship.

63. André Everard Van-Braam Houckgeest, *Voyage de l’Ambassade de la Compagnie des Indes Orientales Hollandaises, vers l’Empereur de la China, en 1794 et 1795*, 2 vols. (Paris: L. E. Moreau De Saint-Méry, 1798), 1:18. On Beale see chapter 3.

64. Chapuis and Gélis, *Le Monde des Automates*, 2:160. One of these automata is illustrated in Van-Braam Houckgeest, *Voyage de l’Ambassade*, 2:377.

65. Petitpierre had requested two or three of the missionaries who had helped set up Macartney’s gifts at the Yunamingyuan the year before. These were probably Adeodato and Paris (both were watchmakers mentioned by Macartney) as well as Conforti, who was at Beijing at the time and is mentioned in young Staunton’s later writings of the trip.

66. Van-Braam Houckgeest, *Voyage de l’Ambassade*, 27–29, 195–96, 200–201, 249, 348.

67. Van-Braam Houckgeest, *Voyage de l’Ambassade*, 348. These were reportedly seized by Heshen, the prime minister, who presented these objects to the court on another occasion (Bonnant, “Western Horology in China,” 32). Heshen had his own substantial collection of treasures, including nineteen large chiming clocks, nineteen small chiming clocks, and over one hundred Western-style pocket watches. Chang Lin-sheng, “The Enamel Snuff Bottles in the Palace Museum Collection,” *National Palace Museum Bulletin* 15, nos. 4–5 (September–December 1980): 8.

68. For a discussion of tribute as a source of revenue to the Neiwufu (Imperial Household Department), see Chang Te-ch’ang, “The Economic Role of the Imperial Household in the Ch’ing Dynasty,” *Journal of Asian Studies* 31, no. 2 (February 1972): 254–56.

69. Yang Boda has made a study of these lists and of goods from Guangzhou still in Beijing. See *Qingdai Guangdong gongpin*, and “Qing Qianlong wushijiunian Guangdong gongwu yipie” (A glimpse of tribute from Canton in the fifty-ninth year of the Qianlong period of the Qing dynasty), *Gugong bowuyuan yuankan* 1986, no. 3: 3–9.

70. See Chen Kaige, “Qingdai Suzhoude zhongbiao zhizao” (On the manufacture of Suzhou clocks in the Qing dynasty), *Gugong bowuyuan yuankan* 1981, no. 4: 90–94. The most interesting is *Artistry in Time*, a catalog of timepieces that were sent from Beijing to Walt Disney World, Orlando, Florida, for an exhibition in 1988. Thirteen of the clocks illustrated were made in Guangzhou; three are of Suzhou manufacture.

71. Xu Wenlin and Li Wenguang, “Tan Qingdai de zhongbiao zhizao” (On the manufacture of Qing dynasty clocks), *Wenwu* 1959, n.2: 35.

72. Liang Zhangju, *Langji xutan* (Further impressions collected during official

travels), *juan* 8 (Beijing: Zhonghua shuju, 1981). Guangzhou and Suzhou also supplied a workforce for the palace workshops.

73. In the early nineteenth century, Xu Chaojun, of Shanghai, published his *Zimingzhongbiao tufa* (Illustrated account of the manufacture of mechanical clocks), stating that he came from a long line of clockmakers. His family had been making clocks and watches in European style for five generations. It is possible that Xu was a descendant of Xu Guangqi (1562–1634), who had worked with Matteo Ricci (Needham, Wang and Price, *Heavenly Clockwork*, 154).

74. MR, 160.

75. Du Halde, *General History of China*, 2:124.

76. Semedo, *That Great Renowned Monarchy*, 27. Emphasis in original.

77. Semedo, *That Great Renowned Monarchy*, 27.

78. MR, 160. This foreign clockmaker was later sent back to Macao, following an altercation between the Jesuits and a stone-throwing Chinese boy (MR, 163). See also D'Elia, *Fonti Ricciane*, entry 255.

79. John Stewart Burgess, *The Guilds of Peking* (New York: Columbia University Press, 1928), 107. While much of the numerical data for this study was gathered in the early twentieth century, much of the information can be applied to the guilds of the late eighteenth and nineteenth centuries. For additional information on nineteenth-century guilds, see D. J. Macgowan, "Chinese Guilds or Chambers of Commerce and Trade Unions," *Journal of the North China Branch of the Royal Asiatic Society*, n.s. 21–22 (1886–87): 133–92.

80. Membership in any guild included participating in religious worship, usually of the guild's founding master or patron. By the twentieth century, this practice was discontinued. For the clock sellers' guild in particular, the ceremonies were originally Roman Catholic, and therefore all guild members were Catholic. However, as Buddhists joined the guild in the early twentieth century, this religious worship was stopped, as no religious ceremony could be found to satisfy both groups (Burgess, *The Guilds of Peking*, 141, 165, 177).

81. Yang Boda, *Qingdai Guangdong gongpin*, 55.

82. Yang Boda, *Qingdai Guangdong gongpin*, 55.

83. Illustrated in the catalog for Sotheby's Hong Kong, October 27 and 28, 1992, lot 267.

84. Peabody Museum catalog numbers: E80,607.10, .21, and .34. These are mentioned, but not illustrated, in H. A. Crosby Forbes, *Shopping in China: The Artisan Community at Canton, 1825–1830* (Baltimore: International Exhibitions Foundation, 1979).

85. The guilds often kept skilled craftsmen in the shops (Burgess, *The Guilds of Peking*, 113; Macgowan, "Chinese Guilds," 336).

86. Chen Kaige, "Qingdai Suzhoude zhongbiao zhizao," 90.

87. Song Boyin, "Qingdai monian Nanjing Suzhou zaozhong shougongye diaocha" (An examination of the clock-making industry in Nanjing and Suzhou in the late Qing dynasty) (photocopy of an article from the Beijing Library, no other details available), 18–19.

88. The text of the stele is reproduced in *Suzhou lishi bowuguan, Jiangsu shifan xueyuan lishixi, Nanjing daxue Ming Qing shi yanjiushi hebian. Ming Qing Suzhou gongshangye beikeji* (Stone inscriptions of Suzhou craftsmen of the Ming and Qing dynasties) (Nanjing: Jiangsu renmin chubanshe, 1981), 204–5. A rubbing of the stele is in the collection of the Suzhou museum.

89. Song Boyin, “Qingdai monian Nanjing Suzhou,” 18–19.

90. Macgowan, “Chinese Guilds,” 336.

91. The records for 1756 make finer distinctions than the later documents. There were four volumes that year covering newly acquired clocks, clocks on display, clocks in the Zuozhongchu, and clocks to be given as gifts. The following year, these four categories appear to have been condensed into two: newly acquired clocks (presumably for imperial use) and clocks for dispersal.

92. The main locations included the Ningshougong, the Sanxitang, the Yusogong, and the Jingyixuan. Clocks were also displayed in the Yangxindian, the Hongdedian, the Yanchunge, the Jingrengong, the Bilinguan, the Shouangong, the Shoukanggong, and the Yonghegong.

93. One clock, for example, housed in 1756 within the Zhaigong was then relocated five times, eventually ending up in the Zhenzhailou in the thirty-fifth year of Qianlong’s reign (1772). Neiwufu zaobanchu (Office of Manufacture of the Imperial Household Department), archival document no. 1873, Number One Historical Archives, Beijing.

94. Documents of 1756 refer to the Yuanhe as a storehouse and show eighty-eight clocks kept here (Neiwufu zaobanchu, archival document no. 1872, Number One Historical Archives, Beijing). Later documents show clocks on display being moved back to this location.

95. The Qianlong emperor’s collection of curio cabinets is now housed in the National Palace Museum, Taipei. One of these is illustrated in *Gugong bowuyuan*, *Gugong zhenwan xuancui* (Masterpieces of Chinese miniature crafts in the Qing dynasty) (Taipei: Gugong bowuyuan, 1971), pl. 7.

96. Neiwufu zaobanchu, archival document no. 1887, clock no. 5, Number One Historical Archives, Beijing.

97. In 1747, the Qianlong emperor had seen an illustration of an elaborate European water fountain and asked Giuseppe Castiglione (1688–1766) if any of the Jesuits at court would be capable of constructing such a fountain. Michel Benoît (in China 1744–74) was chosen. The model he made so pleased the emperor that he decided to build not only the fountain, but a series of palaces in European style. These would be situated in the northeast grounds of the Yuanmingyuan. Castiglione, with the assistance of Jean-Denis Attiret (d. 1768) and Ignatius Sichelbart (d. 1780), drew the plans. A number of other Jesuits and many Chinese contributed their skill or their labor to the project.

There have been several recent publications on the Yuanmingyuan, including Michèle Pirazzoli-t’Serstevens, “The Emperor Qianlong’s European Palaces,” *Orientations* 19, no. 11 (November 1988): 61–71; Michèle Pirazzoli-t’Serstevens, ed., *Le Yuanmingyuan: Jeux d’Eau et Palais Européens de XVIIIe Siècle à la Cour de Chine* (Paris: Editions Recherche sur les Civilisations, ADPF, 1987); Huang Taopeng and Huang Zhongjun, eds., *Yuanmingyuan* (Hong Kong: Joint Publishing, 1985). The palaces were destroyed by Anglo-French forces in 1860. In 1984, a team of French art historians and architects, sponsored by the French Foreign Ministry, were invited to join the Chinese in researching the historical, artistic, and architectural aspects of the European palaces as part of the effort to preserve and restore the site. Results of this research are published in the periodical *Yuanmingyuan*.

98. Most of Benoît’s remaining years were spent constructing waterworks (Pirazzoli-t’Serstevens, “Emperor Qianlong’s European Palaces,” 61).

99. *LEC*, 24:296–97. Hope Danby provides a translation of this work but dates the

letter to the 1740s. *The Garden of Perfect Brightness: The History of the Yüan Ming Yüan and of the Emperors Who Lived There* (London: Williams and Norgate, 1950), 125.

100. A special building was erected to hold these tapestries, but these were not the only French works of this type in the emperor's collection. The Jesuits presented six Beauvais tapestries sent by Louis XV to the Qianlong emperor. Entitled "Teinture Chinoise," these tapestries were designed by the French artist François Boucher (1703–70), after drawings by Attiret, and were manufactured in 1742. They were also displayed at the Yuanmingyuan. There was a first set of tapestries called *tentures chinoises* made at Beauvais in the 1720. Both were extremely popular. Madeleine Jarry, *Chinoiserie: Chinese Influence on European Decorative Art, Seventeenth and Eighteenth Centuries* (New York: Vendome Press, 1981), 15–26; Sullivan, *Meeting*, 67–68; and Hugh Honour, *Chinoiserie: The Vision of Cathay* (London: John Murray, 1961), 92–94.

101. Carroll Brown Malone, *History of the Peking Summer Palaces under the Ch'ing Dynasty* (Urbana: University of Illinois Press, 1934; rpt. New York: Paragon Book Reprint, 1966), 160.

102. Pirrazoli-t'Serstevens, "The Emperor Qianlong's European Palaces," 63.

103. Clarke was in business from 1725 to 1740 (GM, 355 n. 1).

104. GM, 95. There is no record of this clock in Harcourt-Smith's catalog of the imperial collection (H-S). Staunton, *Historical Account*, says of this clock that it was "made early in the present century," 304.

105. GM, 261. Both Macartney and Hüttner remarked that these items were from England. Hüttner wrote that "le plus grand ornement de ces palais consiste en pendules anglaises avec des carillons, la plupart de la main du célèbre Cox" (*Voyage à la Chine*, 93).

106. GM, 125–26.

107. Van-Braam Houckgeest, *Voyage de l'Ambassade*, 223.

108. Neiwufu zaobanchu, document 1887 (QL 37/12/6), Number One Historical Archives, Beijing.

109. Neiwufu zaobanchu, archival document no. 1890 (QL 38/12/6), Number One Historical Archives, Beijing.

110. Paper slips were later attached to some of the entries and give the date the particular clock left the collection. Some of these slips have been lost, and many others are damaged.

111. Named individuals include Nan Furen, He guiren (Mr. He), a man from Jingshan, Mr. Yi.

112. Neiwufu zaobanchu, archival document no. 1871 (QL 21/11/10), Number One Historical Archives, Beijing.

113. James, Lord Elgin, *Letters and Journals of James, Eighth Earl of Elgin*, ed. Theodore Warland (London: John Murray, 1872), 365.

114. Elgin, *Letters and Journals*, 366.

115. Quoted in French in Christopher Hibbert, *The Dragon Wakes: China and the West, 1793–1911* (Harmondsworth, Middlesex: Penguin, 1984), 272, with no reference provided.

116. Hibbert, *The Dragon Wakes*, 272.

117. Some of d'Hérison's accounts are surprisingly similar to the earlier work by J. L. de Negroni, *Souvenirs de la Campagne de Chine* (Paris: Imprimerie Renou et Maulde, 1864).

118. Le Comte d'Hérison, *Journal d'un Interprète en Chine* (Paris: Paul Ollendorf, 1886), 337–38.

119. Negroni, *Souvenirs*, 51.
120. D'Hérison, *Journal d'un Interprète*, 338.
121. James L. Hevia examines the multiple transformations and meanings of these objects as they passed from Chinese to European hands in "Loot's Fate: The Economy of Plunder and the Moral Life of Objects 'From the Summer Palace of the Emperor of China,'" *History and Anthropology* 6, no. 4 (1994): 319–45.
122. Hevia, in "Loot's Fate," provides a complete list of the London auctions of goods from the Summer Palace, 341–42.
123. *Catalogue d'une précieuse collection d'objets d'art et de curiosité de la Chine provenant du Palais d'été de Yuen-ming-yuen* (Paris: Imprimerie de Pillet fils aîné, 1861).
124. They are reported to come from the collection of Stuart Blaine and Robert Booth. Three other animal heads from the fountain exist and are in private collections (Sotheby's New York, October 9 and 10, 1987, lots 134 and 135).
125. *Illustrated London News*, April 13, 1861, 334, 339.
126. *The Queen*, January 18, 1862, 398.
127. International Exhibition of 1862, *Illustrated Catalogue*, 3:43–44.
128. *Illustrated London News*, May 6, 1865, 423.
129. Negroni, *Souvenirs*, 219.
130. Unfortunately, Negroni's descriptions of these pieces are short, and therefore it is not possible to compare them with pieces in Cox's catalogs, for example.
131. Hevia, "Loot's Fate," 331.
132. Negroni, *Souvenirs*, 54–56.
133. See the catalog *Le Musée Chinois de l'Impératrice Eugénie* (Paris: Réunion des Musées Nationaux, 1994).
134. Wan Yi, Wang Shuqing, and Lu Yanzheng, *Qingdai gongting shenhua*, 138.
135. P1, 72.
136. On one occasion, one truck fell from a bridge to the river below. Fortunately, this truck was carrying crates of books, which were undamaged in the fall; the other trucks held fragile porcelains. It was also lucky that there had been a drought and the river was dry; otherwise the books would have been destroyed by the water.
137. See Na Zhiliang, *Gugong bowuyuan: Sanshi nian zhi jingguo* (The Palace Museum: Thirty years) (Taipei: Zhonghua congshu bian shen weiyuanhui, 1957); Na Zhiliang, *Gugong sishi nian* (Forty years of the Palace Museum) (Taipei: Shangwu yinshuguan, 1966); Chang Lin-sheng, "The National Palace Museum: A History of the Collection," in Fong and Watt, *Possessing the Past*, 3–25. I would also like to thank Allen Weaving for his assistance here.
138. Personal correspondence from Yang Boda, deputy director, Palace Museum, Beijing, dated December 3, 1992. There are no items of this type in the National Palace Museum, Taiwan.
139. Li Jiannong, *Zhongguo jinbainian zhengzhi shi* (A political history of China during the past hundred years) (Shanghai: Shangwu yinshuguan, 1948), 11.
140. Beatrice S. Bartlett, *Monarchs and Ministers* (Berkeley and Los Angeles: University of California Press, 1991), 238.
141. Xiao Yishan, *Qingdai tongshi* (Complete history of the Qing dynasty) 5 vols. (1928–31; rpt. Taipei: Commercial Press, 1967), 2:211.
142. E. Backhouse and J. O. P. Bland, *Annals and Memoirs of the Court of Peking* (Boston: Houghton Mifflin, 1914), 364.
143. Li Jiannong, *Zhongguo jinbainian zhengzhi shi*, 11.

144. This indemnity was \$335 million dollars (Backhouse and Bland, *Annals and Memoirs*, 367).
145. The full list is enumerated in Backhouse and Bland, *Annals and Memoirs*, 366–67.
146. This summation of the complex interrelationship between the economic expansion in the Qing dynasty and its social implications is based on the work of Susan Naquin and Evelyn S. Rawski, *Chinese Society in the Eighteenth Century* (New Haven: Yale University Press, 1987).
147. William H. Nienhauser Jr., ed., *The Indiana Companion to Traditional Chinese Literature* (Bloomington: Indiana University Press, 1986), 452.
148. Nienhauser, *Indiana Companion*, 454.
149. There have been studies made of these objects as they appear in *Honglou meng*. See Chen Dinghong, “Guanyu ‘Honglou meng’ zhongzhi zhongji qita” (On clocks in *Dream of the Red Chamber* and related matters), *Dongfang zazhi* 40, no. 21: 42; Fang Hao, “Cong ‘Honglou meng’ suoji xiyang wupin kao gushi de beijing” (Discussion of the Western objects in *Dream of the Red Chamber*), in *Fang Hao liushi ziding gao* (Taipei: Taiwan xuesheng shuju, 1969), 1:413–96.
150. These passages are found in chapters 51 and 52. In the translation by David Hawkes to which I refer here, these passages may be found on 524 and 553, respectively. Cao Xueqin, *The Story of the Stone*, trans. David Hawkes, vol. 2 (Harmondsworth, Middlesex: Penguin, 1987).
151. See figure 3 in Xu Wenlin and Li Wenguang, “Tan Qingdai de zhongbiao zhizao,” 35.
152. Cao, *Story of the Stone*, chap. 92, 4:245.
153. Cao, *Story of the Stone*, chap. 6, 1:158.
154. Cao, *Story of the Stone*, chap. 6, 1:158, at Rongguo Palace. Xu Wenlin and Li Wenguang have suggested that the clock that Grannie Liu saw was one that indicated the traditional Chinese double hours (“Tan Qingdai de zhongbiao zhizao,” 34).
155. Cao, *Story of the Stone*, chap. 14, 1:273–74.
156. Zhao Yi, *Yanpu zaji* (Miscellaneous notes) (rpt. Beijing: Zhonghua shuju, 1982), *juan* 2, 36.
157. Zhao Yi, *Yanpu zaji*, *juan* 2, 36.
158. Zhou Xun and Gao Chunming, *Five Thousand Years of Chinese Costumes* (Hong Kong: Commercial Press, 1987), fig. 337. See also Ji Ruoxin, “Qingdai de huabao yu huolian huabao” (Qing dynasty purses and flint pouches), *Gugong wenwu yuekan* 8, no. 9 (1990): 7, 9. Wearing watches around the neck is mentioned in MR, 180 and 506.
159. R.O.M. accession number 928.29.280.
160. Clarke Abel, *Narrative of a Journey in the Interior of China, and of a Voyage to and from that Country, in the Years 1816 and 1817; Containing an Acc’t of the Most Interesting Transactions of Lord Amherst’s Embassy to the Court of Peking, and Observations on the Countries Which it Visited* (London: Longman, Hurst, Rees, Orme, and Brown, 1818), 82.
161. Frank Dorn, *The Forbidden City: The Biography of a Palace* (New York: Charles Scribner’s Sons, 1970), 201. A watch of similar description is in the National Palace Museum, Taiwan, and is illustrated in Liao Wenxiong, “Zhenzhu yu zhenzhu” (Genuine pearls and treasured pearls), *Gugong wenwu yuekan* 5, no. 12 (1988): 108, although no details about this watch are given.

162. I am grateful to Dr. Jan Fontein for this information on modern-day Chinese custom.
163. R.O.M. accession number 928.29.270.
164. See Zhang Linsheng, “Yuancang xuansu jiaoying de biyanhu” (Snuff bottles in the Palace Museum’s collection), *Gugong wenwu yuekan* 7, no. 2 (1989): 14–25.
165. One example is a woman’s overgarment of the late nineteenth or early twentieth century in the collection of the Victoria and Albert Museum, illustrated in Verity Wilson, *Chinese Dress* (London: Victoria and Albert Museum, 1986), figs. 49 and 63.
166. D. J. Macgowan, “On Chinese Horology,” included in chapter 9, “Communications,” from *Report of the Commissioner of Patents for the Year 1851*, part 1: *Arts and Manufactures* (Washington, D.C., 1852), 340.
167. This is confirmed by the records of companies such as those of Jaquet-Droz et Leschot, cited in Chapuis, *Rérelations de l’Horlogerie Suisse*; and in Charles Perregaux and F.-Louis Perrot, *Les Jaquet-Droz et Leschot* (Neuchâtel: Attinger Frères, 1916).
168. GM, 266–67.
169. Georg Simmel, *The Philosophy of Money* (1907; London: Routledge, 1978). For an extended discussion of value and commodities, see Arjun Appadurai, “Introduction: Commodities and the Politics of Value,” in *The Social Life of Things*, ed. Arjun Appadurai (Cambridge: Cambridge University Press, 1986), 3–63.
170. Ellen Uitzinger, “For the Man Who Has Everything: Western-Style Exotica in Birthday Celebrations at the Court of Ch’ien-lung,” in *Conflict and Accommodation in Early Modern East Asia*, ed. Leonard Blussé and Harriet T. Zurndorfer (Leiden: E. J. Brill, 1993), 216–39. Here, Uitzinger examines the Western-style buildings erected for the sixtieth birthday celebration of Empress Dowager Zhongqing in January 1752 with those for Qianlong’s eightieth birthday festivities in 1790.

Chapter 3

1. A list of European clockmakers whose work formed part of the China trade may be found in appendix B.
2. DL, 230–35.
3. Arthur Ord Hume, in *Clockwork Music: An Illustrated History of Mechanical Instruments from the Musical Box to the Pianola, from Automaton Lady Virginal Players to Orchestrion* (New York: Crown, 1973), 22, and others too, give the date of Cox’s death as 1788. However, he is listed as a beneficiary in his son’s will, dated February 25, 1789 (reproduced in J. M. Braga, “A Seller of ‘Sing-Songs’: A Chapter in the Foreign Trade of China and Macao,” *Journal of Oriental Studies* 6 (1961–64): 108). Clare Le Corbeiller in “James Cox: A Biographical Review,” *Burlington Magazine*, June 1970, 350–58, shows that Cox lived well into 1791, passing away either late that year or in January of the following year.
4. According to his trade card, ca. 1752, in the collection of the British Museum, illustrated in Le Corbeiller, “James Cox,” fig. 2.
5. Listed as “Piece the Forty-Fifth. A Swan as large as life,” with plumage so meticulously copied and movements so “artfully imitated” that “at a distance [it could] deceive the most accurate observer.” James Cox, *A Descriptive Inventory of the Several Exquisite and Magnificent Pieces of Mechanism and Jewellery, Comprised in the Schedule to an Act of Parliament, made in the Thirteenth Year of the Reign of His Majesty, George the Third; for Enabling Mr. James Cox, of the City of London, Jeweller, to*

dispose of his Museum by Way of Lottery (London: H. Hart for Mr. Cox, 1773), 35–36. This catalog was reprinted in 1774.

6. The silver swan was exhibited by Cox in 1773. A few years later, it was included in the inventory of Davies's Grand Museum, about which very little is known. From there, the swan passed to Weeks's Museum, where it was exhibited as early as 1802. When Weeks died, the swan was sold at auction on July 16, 1836. In 1867, the swan was put on display at the Paris Universal Exhibition by Bond Street jeweler Harry Emanuel. In Paris, the swan was seen by Mark Twain, who mentions it in *The Innocents Abroad*. In 1871, John Bowes purchased the swan; in 1877, it was set up in the Bowes Museum. A full history and description of the swan's workings are given in T. P. Camerer Cuss, "The Silver Swan," *Antiquarian Horology* 4, no. 11 (June 1965): 330–34. For a more recent study on the history of the silver swan, see Sarah Kane, "Metamorphosis and Stasis—the Life History of the Bowes Museum's Silver Swan," a paper presented at the annual meeting of the Association of Art Historians, Victoria and Albert Museum, April 1995.

7. Cox, *Descriptive Inventory*, 1773, 35–36.

8. This idea was later revived by J. E. Reutter in 1913. He used changes in temperature to power his Atmos clock. Unlike Cox's perpetual motion clock, which could utilize both rising and falling barometric pressures, Reutter's clock wound itself only when the temperature fell. Alan Smith, *Clocks and Watches: American, European, and Japanese Timepieces* (New York: Crescent Books, 1989), 204.

9. Cox, *Descriptive Inventory*, 1773, "Piece the Forty-Seventh," 39–40.

10. Ord Hume, *Clockwork Music*, 22.

11. Le Corbeiller, "James Cox," 351–52.

12. Le Corbeiller, "James Cox," 351.

13. Meyrick, in his 1868 description of one of Cox's pieces, incorrectly gives the address as No. 3 Shoe Lane. William Meyrick, *A Short Account of the Remarkable Clock Made By James Cox, in the Year 1766, By Order of the Hon. East India Company for the Emperor of China: Illustrated* (London: Wertheimer, Lea and Co., 1868).

14. Cox had died by this time, but his business carried on under the name of James Cox and Son.

15. Cox, *Descriptive Catalogue*, March 2, 1772.

16. Concerning the Indian market, Cox noted his "success of some trials among the Princes of India" (*Descriptive Catalogue*, March 2, 1772, 3). Some of Cox's work may be found in Russia. One is a very large automaton in the form of a peacock in a tree that, on the hour, calls out and spreads its tail while at the same time a rooster crows and a small spherical cage housing an owl rotates, setting twelve bells ringing. Made by Cox in 1788, this elaborate work is now in the Hermitage, St. Petersburg. Ernst Zinner, "Clocks in Russian Museums," *Antiquarian Horology* 2, no. 11 (June 1959): 208, fig. 3.

17. In addition to Cox's *Descriptive Catalogue*, March 2, 1772, and *Descriptive Inventory*, 1773, and Meyrick's *Short Account*, already cited, these extant catalogs are as follows: James Cox, *A Description of a Most Magnificent Piece of Mechanism and Art* (London, 1769); James Cox, *A Descriptive Catalogue of the Several Superb and Magnificent Pieces of Mechanism and Jewellery, Exhibited in Mr. Cox's Museum, at Spring Gardens, Charing Cross* (London, 1772), dated July 6, 1772, with some additions to the above; James Cox, *A Descriptive Inventory of the Several Exquisite and Magnificent Pieces of Mechanism and Jewellery, Comprised in the Schedule Annexed to an Act of Parliament, made in the Thirteenth Year of the Reign of His Majesty, George the*

Third; for enabling Mr. James Cox, of the City of London, Jeweller, to Dispose of his Museum by Way of Lottery (London, 1774).

18. Cox, *Descriptive Inventory* (1774), ii.
19. The inventory of the museum and details of the lottery are to be found in the Guildhall, London (Ord Hume, *Clockwork Music*, 22).
20. Ord Hume, *Clockwork Music*, 23.
21. DL, 231.
22. Staunton, *Historical Account*, 26–27.
23. Meyrick, *Short Account*, 6, citing Cox.
24. One of these is the chronoscope described below. The other is a pair of elaborate clocks that Cox lists as “Two rich caparisoned Bulls” in his 1773 catalog. Of “Piece the Ninth,” Cox writes that the bulls “support an ornament, on which stand four winged Dragons, bearing an elegant Commode, . . . and filled with musical chimes and mechanical motions.” Cox, *Descriptive Inventory*, 1773, 17. Harcourt-Smith describes a pair of clocks by Cox as follows: “A watch movement . . . rests on a commode shaped stand ornamented with complicated arabesques, flowers, etc. This is supported on the backs of 4 griffons which are in turn balanced on two large bulls . . . profusely ornamented . . . This fantastic composition, although lavishly decorated and skillfully executed, can hardly be classed as one of this great maker’s happiest inspirations” (H-S, 13–14).
25. Meyrick, *Short Account*; and “A Description of two curious Clocks, intended as a present from the East India Company to the Emperor of China; made by English artists,” *Gentleman’s Magazine* 36 (1766), 586.
26. Meyrick, *Short Account*, 12.
27. *St. James’s Chronicle*, no. 1800 (August 27–29, 1772), cited in Le Corbeiller, “James Cox,” 352.
28. Cox, *Descriptive Inventory*, 1773, iv.
29. Cox, *Descriptive Catalogue*, March 2, 1772, 13.
30. Cox, *Descriptive Inventory*, 1773, 9. The *Triton* was a 637-ton ship that made four voyages to China between 1766 and 1775, its years of service for the East India Company. Jean Sutton, *Lords of the East: The East India Company and Its Ships* (London: Conway Maritime Press, 1981), 166.
31. Cox, *Descriptive Catalogue*, March 2, 1772, 13. The chronoscope is discussed below.
32. This is “Piece the Second” in the 1772 catalog. The similar piece sent to China to which Cox refers is probably the one numbered WYT no. 554, illustrated in H-S, pl. 18. Cox describes the piece as a sumptuously caparisoned horse with bridle held by a turbaned Arabian, made of gold. They stand before a golden tent, jeweled and lined with mirrors that reflect the horse. The pedestal on which they stand contains “an exquisite effort of mechanical workmanship; on each side there are elegant designs and curious motions” (11–12). The palace piece is of a “horse with paste trappings led by an Arab groom. The Group stands upon a bronze-gilt pedestal, four sides of which are decorated with landscapes and an elaborate series of moving figures. . . . Behind the groom is a mirror half draped by bronze gilt curtains. . . , which fall from a tent-shaped canopy” (H-S, 16).
33. *Gentleman’s Magazine* 48 (1778): 552, lists the bankruptcy of “James Cox the Elder, of Shoe-lane, London, jeweller.” Chapuis (*Rérelations de l’Horlogerie Suisse*, 28) gives a date for Cox’s bankruptcy as 1790, but I can find no mention of this in the *Gentleman’s Magazine*.

34. Le Corbeiller, "James Cox," 355.
35. John Henry Cox died of natural causes on October 8, 1791, and was buried in the foreign cemetery on Danes Island, at Whampoa (Braga, "Seller of Sing-Songs," 100). There are several inconsistencies in Braga's article. In one instance, John Henry Cox is listed as twenty-three years of age in 1774 and as thirty-four years of age in 1791. John King Fairbank in *Trade and Diplomacy on the China Coast* (Cambridge: Harvard University Press, 1969), vol. 2, appendix A, 56, lists the date of death of John Henry Cox as 1791; however, in a letter dated May 1793 to Lord Macartney upon his arrival in China, Père Jean-Joseph de Grammont mentions meeting his "good friend" John Henry Cox (Pritchard, "Letters from Missionaries," 8). According to John Henry Cox's last will and testament (as reproduced in Braga), he had two siblings, James Jr. and Elizabeth.
36. Hosea Ballou Morse, *The Chronicles of the East India Company Trading to China, 1635–1834*, 5 vols. (Oxford: Clarendon Press, 1926), 2:142; and Georg Hafstöm, "John Henry Cox som Svensk Sjöofficer," *Forum Navale* 14 (1957): 9.
37. John Henry Cox and his company are first mentioned in the East India Company records of 1783 (Morse, *Chronicles*, 2:85).
38. Michael Greenberg, *British Trade and the Opening of China, 1800–1842* (Cambridge: Cambridge University Press, 1951), 22–23.
39. The lineage of Cox's firm is a complicated and convoluted affair. This information is compiled from a number of sources, including Fairbank, *Trade and Diplomacy*; Le Corbeiller, "James Cox"; Greenberg, *British Trade*. Greenberg is not a completely reliable source. Although the information is supposedly from records of the East India Company, I have found numerous errors in names and dates.
40. Fairbank, *Trade and Diplomacy*, 1:60–61, 2:56–57; and Greenberg, *British Trade*, 86.
41. Samuel Shaw, *The Journals of Major Samuel Shaw, The First American Consul at Canton*, ed. Josiah Quincy (Boston: Wm. Crosby and H. P. Nichols, 1847; rpt. Taipei: Ch'eng-Wen, 1968), 245.
42. Fairbank, *Trade and Diplomacy*, 60.
43. Chapuis, *Rélations de l'Horlogerie Suisse*, 62–64.
44. Greenberg, *British Trade*, 23 n. 2, from company records of 1830. Greenberg also mistakenly states, "There were at this time no Chinese watches."
45. A painting in the collection of the Palace Museum, Beijing, shows a man in ordinary dress wearing ornaments, including a watch suspended from his belt. This is illustrated in Zhou Xun and Gao Chunming, *Five Thousand Years*, fig. 337.
46. Eugène Jaquet and Alfred Chapuis, *Technique and History of the Swiss Watch from Its Beginning to the Present Day* (Boston: Boston Book and Art Shop, 1953), 144.
47. Greenberg, *British Trade*, 23.
48. Cited in Greenberg, *British Trade*, 24.
49. Furs were a popular item with the Chinese. In private trade at Guangzhou in 1785–86, furs worth nearly forty thousand pounds were sold, and a high level of nearly five hundred thousand pounds was reached in 1792–93. This accounted for more than one-half of the total imports in private trade that year (Pritchard, "Crucial Years," 401, appendix 11).
50. Greenberg, *British Trade*, 24.
51. Cox had convinced the Swedish government that he would be an asset in the war against the Russians. He instead set off for the Pacific in search of seal skins for the

Chinese market. For more information on John Henry Cox's adventures under the Swedish flag, see Hafström, "John Henry Cox," 6–29.

52. Greenberg, *British Trade*, 24–25.

53. Cited in Chapuis, *Rélations de l'Horlogerie Suisse*, 57.

54. GM, 312.

55. Sutton, *Lords of the East*, 77.

56. Sutton, *Lords of the East*, 76–77. The *Earl of Sandwich* was 804 tons and made four voyages between 1771 and 1782. There seems to be some ambiguity as to what date the ship passed out of company service: in citing the papers of John Wordsworth held at the Carlyle Records Office, Sutton (167) shows the ship was still in service in 1783.

57. GM, 311–13.

58. *The Hindostan*, a 1,246-ton ship, was in service with the East India Company from 1789 to 1802, making six voyages during those years (Sutton, *Lords of the East*, 167).

59. In the "notes" to his journal entry of August 3, 1793, Macartney wrote: "The loading continues and it is hoped that it may be finished tomorrow. . . . [Captain Mackintosh] may come to Peking if he pleases but merely from curiosity and not from trade. Nothing can be produced lest it might be of prejudice to our own presents, if finer. . . . I think he has behaved very ill in this manner" (GM, 45).

60. This amount included Mackintosh's normal allowance of £5,980 as commander of the vessel, plus an additional £1,500 for this voyage. The private trade total was comprised of £5,980 for the commander, £500 for the chief mate, £220 for the second mate, £90 for the third mate, £82 for the fourth mate, £800 for the purser, £260 for the surgeon, £170 for the surgeon's mate, £20 for the midshipman, £10 for the carpenter's first mate, and an additional £1,500 for this voyage. Most of the trade was in furs and lead, but ginseng, perfume, carpets, beer, glass, and hats were also traded (Pritchard, "Instructions," pt. 1, 228 n. 1). This amount is incorrectly given as £9,623 for Mackintosh alone in GM, 312.

61. Journal entry for July 25, 1793 (GM, 69).

62. Journal entry for August 30 (GM, 100–101). Macartney's purchases from Mackintosh are discussed in chapter 2.

63. Chapuis and Droz, *Automata*, 109.

64. Christie's auctioned Cox's property from both London and Canton in early 1792. The sale listed "Valuable Effects, Late the Property of Mr James Cox, of Shoe Lane, Jeweller," on February 16, 1792 (Le Corbeiller, "James Cox," 355 n. 27).

65. Fairbank, *Trade and Diplomacy*, 60–61.

66. Greenberg, *British Trade*, 25.

67. Samuel Wells Williams, *The Middle Kingdom: A Survey of the Geography, Government, Literature, Social Life, Arts, and History of the Chinese Empire and Its Inhabitants*, 2 vols. (New York: Charles Scribner's Sons, 1883), 1:341.

68. These accounts include Williams, *The Middle Kingdom*, 1:341; and Sir John Francis Davis, *The Chinese: A General Description of China and Its Inhabitants*, 4 vols. (vol. 1, London: C. Cox, 1851; vol. 2, Charles Knight and Co., 1845; vol. 3, Charles Knight and Co., 1846; supplement, Charles Knight and Co., 1845), 1:98.

69. Williams, *The Middle Kingdom*, 1:341.

70. Peter Ward Fay, *The Opium War, 1840–1842: Barbarians in the Celestial Empire in the Early Part of the Nineteenth Century and the War by Which They Forced Her Gates Ajar* (Chapel Hill: University of North Carolina Press, 1975), 199, 327.

71. Cited in Chapuis, *Rélations de l'Horlogerie Suisse*, 32. Following this quotation,

Chapuis writes, “What type of bird is this about? Mechanical birds, assuredly.” Considering the great fame of his aviary, his sizable collection of live birds, and the fact that Beale had been out of the “sing-song” trade for at least two decades, it seems highly unlikely that Bovet was here referring to mechanical pieces. This date of death contradicts those of other sources: Fairbank, *Trade and Diplomacy*, gives it as 1842, and Williams, *The Middle Kingdom*, as 1840.

72. Chapuis, *Rélations de l’Horlogerie Suisse*, 64.

73. Fairbank, *Trade and Diplomacy*, 56; and Greenberg, *British Trade*, 27–28. The ledgers from this period may be found in the Jardine Matheson archives at the Cambridge University Library.

74. In keeping with the trend set by previous partners: Charles Magniac was the Prussian vice-consul; James Matheson had Danish papers; Thomas Dent, another merchant active at the time, held Sardinian papers; Robert Hamilton carried no foreign papers and thus could not stay the whole year in China (Greenberg, *British Trade*, 26–28).

75. An illustration of this musical clock, which was purchased by a Dr. Loup in 1925, may be found in P1, 73. However, there is no mention of a clock by Cox in Macartney’s journal, only those by Justin Vulliamy of London (GM, 96, 99). W. Craft of London was active ca. 1773–96 in making automata and clocks (GB, 69).

76. Staunton, *Authentic Account*, 3:54.

77. Hüttner, *Voyage à la Chine*, 92–93.

78. These Chinese were Jacobus Li (also spelled Ly) and Pablo Cho, from the College for Chinese at Naples, and were of the Congregation of the Propagation of the Faith (GM, 24). The elder Staunton brought these interpreters, who were “qualified to interpret between their own language and the Italian or Latin,” to England prior to the embassy’s departure (Staunton, *Historical Account*, 26).

79. GM, 99–100.

80. GM, 351, diary entry of September 14, 1793.

81. Staunton is also known for his translation of Qing legal statutes, the *Ta Tsing Leu Lee; Being the Fundamental Laws, and a Selection from Supplementary Statutes of the Penal Code of China* (London: T. Cadwell and W. Davies, 1810). In 1823, he cofounded the Royal Asiatic Society.

82. Extracted from the manuscript text, “Journal of a Voyage to China” (August 30, 1793, to February 1, 1794), of George Thomas Staunton now in the collection of library of Duke University, North Carolina. The spelling and the punctuation of these passages are unaltered from the original. For a full description, see (1769). See also “Piece the First” in Cox, *Descriptive Catalogue*, July 6, 1772, 5–15.

83. It is not certain whether young Staunton here referred to Thomas Beale or his brother Daniel. At this time, the company would have been known as Reid, Beale and Company.

84. Jaquet-Droz et Leschot made a similar piece in the late eighteenth century that was presented to the Spanish court. Like the automaton young Staunton observed in China, the Jaquet-Droz et Leschot piece had a dog guarding a bowl of fruit; when one piece was removed, the dog began to bark in a “very natural manner” (Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 56).

85. Staunton, “Journal of a Voyage,” August 30, 1793, to February 1, 1794. Emphasis in original.

86. Van-Braam Houckgeest, *Voyage de l’Ambassade*, 326–29.

87. Van-Braam Houckgeest, *Voyage de l’Ambassade*, 18.

88. Félix Renouard de Sainte-Croix, *Voyage Commercial et Politique aux Indes Orientales, aux Iles Philippines, à la China, Avec des Notions Sur la Cochinchine et le Tonquin, Pendant les Années 1803, 1804, 1805, 1806 et 1807* (Paris: Aux Archives du Droit Français, 1810), 134.

89. Faith Dennis, "Some Jeweled 'Toys' of Georgian London," *Bulletin of the Metropolitan Museum of Art* 5, no. 6 (February 1947): 164.

90. GB, 344.

91. It would be incorrect to say that these were Swiss makers. Geneva was an independent republic until 1798, when it was annexed to France. In 1814, it was independent again and the next year became part of the Swiss Confederation. In 1707, Neuchâtel was part of Prussia and joined the Swiss Confederation in 1815.

92. Long, uncomfortable, and dangerous travel was only one of the unpleasant conveniences associated with foreign trade. Banditry was also a problem. In eighteenth-century Italy, for example, watch merchants were often taken as prisoners and held for ransom. Often these travelers would require that their employers sign a contract stating that the employers would pay for the release of the traveler, if captured. The watches, of course, were never to be ransomed (DL, 253).

93. The first reference to mention the interest that the Turkish court had in clocks from Geneva dates to the late fifteenth century, in Francesco Suriano's *Il Trattato di Terra Santa e dell'Oriente*. See Cengiz Köseoğlu, *The Topkapı Saray Museum: The Treasury*, trans. and ed. J. M. Rogers (New York: New York Graphic Society; Little, Brown, 1987), 31. On clocks as tribute to the Turkish court in the sixteenth century, see Gottfried Mraz, "The Role of Clocks in the Imperial Honoraria for the Turks," in Maurice and Mayr, *The Clockwork Universe*, 37–48.

94. DL, 238–39; and Catherine Cardinal, *The Watch from Its Origins to the Nineteenth Century*, trans. Jacques Pages (Secaucus, N.J.: Wellfleet Press, 1989), 45, 57. Jean-Jacques Rousseau's father, Isaac, early in the eighteenth century traveled to Constantinople, where he repaired watches from Geneva. His son referred to him as "the watchmaker of the Seraglio" (*Confessions*, cited in Cardinal, 46).

95. Makers from other countries also made pieces for the Turkish market. A musical automaton in the form of an elephant that moves its trunk stands on a pedestal with moving pictures. This piece is identified simply as "European," dates from the eighteenth to nineteenth centuries, and is presently in the collection of the Topkapı Saray Museum (Köseoğlu, *The Topkapı Saray Museum*, 208, and pl. 124).

96. DL, 241–47.

97. DL, 253.

98. Cardinal, *Watch*, 57.

99. Cardinal, *Watch*, 57–59.

100. Chapuis, *Rélations de l'Horlogerie Suisse*, 51–52. Chapuis discusses the Swiss makers in China active in the nineteenth century, and therefore much of his monograph is devoted to makers such as Bovet, the Vacher brothers, Borel, Juvet, and the Dimier brothers, who will not be considered in this study. In his chapter on Swiss makers in China in the eighteenth century, Chapuis mentions but two: François-Louis Stadlin (1658–1740), a Jesuit at the Chinese court; and Charles-Henri Petitpierre-Boy, both of whom have been discussed in the previous chapter.

101. Constant authored *Récit de Trois Voyages à la Chine* (1779–93).

102. Some of Charles de Constant's manuscript letters, housed in the Bibliothèque de Genève, that pertain to European horology in China have been reproduced by Cha-

puis, *Rélations de l'Horlogerie Suisse*. Chapuis also mentions where others in the collection have been published (52).

103. Charles de Constant's journal, cited in Chapuis, *Rélations de l'Horlogerie Suisse*, 57. The Geneva makers were well aware of the reputation of the English makers as early as the early eighteenth century; at that time they would often copy watches by London makers or add the name "London" to a watch (DL, 248).

104. Manuscript letter of January 19, 1784, of de Constant, no. 17, 48, as cited in Chapuis, *Rélations de l'Horlogerie Suisse*, 56.

105. Translated from the French manuscript letter cited by Chapuis, *Rélations de l'Horlogerie Suisse*, 57.

106. Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 100.

107. Musée National des Techniques, *Jacques Vaucanson* (Paris: Salles et Grange, 1983).

108. Sir David Brewster, *Letters on Natural Magic, Addressed to Sir Walter Scott, Bart. by Sir David Brewster, K.H.* (London: John Murray, 1832), 268–69.

109. Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 37. Jean Bernoulli studied at Basle and in 1705 was appointed chair of mathematics at the University of Basle. He is best known for his discovery of exponential calculus. His son, Daniel, was a professor of anatomy and botany at the University of Basle, beginning in 1733, and later became a professor of experimental and speculative philosophy.

110. Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 42–55.

111. Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 77.

112. Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 91.

113. Jaquet and Chapuis, *Swiss Watch*, 98.

114. This prospectus, entitled "Description succincte de divers ouvrages de mécanique, inventés par les Sieurs P. Jaquet Droz & H. L. Jaquet Droz, horlogers & artistes à la Chaux-de-Fond, dans le comté de Neuchatel en Suisse," is quoted in its entirety in Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 102–4.

115. Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 102.

116. Henry Maillardet was the uncle of Jean-David Maillardet, who worked as a maker of automata with his uncle in London beginning in 1792. Jean-David's son, Victor, lived in Calcutta and worked the clock trade there, probably originally as Henry Maillardet's representative (Jaquet and Chapuis, *Swiss Watch*, 142).

117. Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 128–30.

118. Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 232.

119. These account books formerly belonged to F.-Louis Perrot of Chambésy and have been published in part by Chapuis, *Rélations de l'Horlogerie Suisse*, 62–64; and Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 232.

120. Chapuis, *Rélations de l'Horlogerie Suisse*, 242.

121. Perregaux and Perrot name the company as Cox and Beale, 1792 (*Les Jaquet-Droz et Leschot*, 119).

122. Chapuis, *Rélations de l'Horlogerie Suisse*, 231. I can find no other record of this astronomical clock.

123. GM, 361.

124. Perregaux and Perrot, cited in Chapuis and Droz, *Automata*, 302.

125. Chapuis and Gélis, *Le Monde des Automates*, 2:249.

126. Chapuis and Droz, *Automata*, 300–302.

127. Chapuis, *Rélations de l'Horlogerie Suisse*, 62–64, and Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 242.

128. Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 232. Another pair of cages was still more elaborate, as each one was topped with a tree “entouré” with a large spiral from which descended little balls that were “eaten” by a lizard. Both of these pieces had timepieces that chimed on the hour and quarter-hour.

129. H-S, 15, pl. 16; LY, 115.

130. Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 233.

131. Perregaux and Perrot, *Les Jaquet-Droz et Leschot*, 123, 244, 248, 249.

132. This is compiled from entries in H-S.

133. The Americans entered the foreign watch trade rather late, not until the second quarter of the nineteenth century, and their activities parallel those of the contemporary Swiss industry, as they too were conscious of adapting the product for a specific market. D. J. Macgowan, a medical doctor resident at Ningpo, made specific recommendations to the commissioner of patents in August 1851. Unfortunately, his recommendations came too late. By this time, the industry was waning, and the Americans also had to compete with the more experienced Swiss. Furthermore, the Jiaqing emperor (r. 1796–1820) was not interested in promoting foreign trade. Macgowan was nevertheless keen on having the United States join this market on a large scale that would prove to be “mutually advantageous to the two great nations on the opposite shores of the Pacific,” as he believed that “clocks can be made an article of extensive import into China.” His writing was motivated by patriotism and came in response to a request by the commissioner of patents made several years earlier for information from American citizens in China that could be useful to American industry (Macgowan, “On Chinese Horology,” 335–42).

134. These are discussed by Chapuis in *Rélations de l’Horlogerie Suisse*, where he devotes considerable space to nineteenth-century Swiss makers in China.

135. DL, 248.

136. Cox, *Descriptive Inventory*, 1774, ii.

137. Cox, *Descriptive Catalogue*, July 6, 1772, 3.

138. DL, 268.

139. DL, 271.

Chapter 4

1. A full discussion of chinoiserie is beyond the scope of this work. For a more complete look, see Honour, *Chinoiserie*; Oliver Impey, *Chinoiserie* (New York: Charles Scribner’s Sons, 1977); and Jarry, *Chinoiserie*.

2. The term *chinois* first appeared in the English language as early as 1613 in Samuel Purchas’s *Purchas His Pilgrims*. *Chinoiserie*, referring to a Chinese notion or conduct, appeared much later, in an 1883 issue of *Harper’s* magazine. *Oxford English Dictionary*, prepared by J. A. Simpson and E. S. C. Weiner (Oxford: Clarendon Press, 1989).

3. Ellen Paul Denker, *After the Chinese Taste: China’s Influence in America, 1730–1930* (Salem, Mass.: Peabody Museum of Salem, 1985), 5.

4. James Cawthorne, “Of Taste” in *Poems, by the Rev. Mr. Cawthorne* (London: W. Woodface, 1771), 115–16.

5. Pierre Belon, *Les Observations de Plusieurs Singularités et Choses Mémorables, Trouvées en Grèce, Asie, Indée, Egypte, Arabie et Autre Pays Estrangés* (Paris, 1553;

enlarged edition Antwerp, 1555). Belon was one of the first to study the science of comparative anatomy.

6. In the second half of the eighteenth century, Abbé Raynal said that the East Indies was “all regions beyond the Arabian Sea and the Kingdom of Persia” (Lach, *Asia*, vol. 1, bk. 1, p. 4).

7. Marco Polo, *The Travels*, trans. Ronald Latham (1958; rpt. Harmondsworth, Middlesex: Penguin, 1982). Donald Lach has called this work “the most comprehensive and authoritative account of the East produced before 1550” (*Asia*, vol. 1, bk. 1, p. 36). This is some controversy on whether or not Polo traveled to China. See Frances Wood, *Did Marco Polo Go to China?* (Boulder, Colo.: Westview Press, 1996).

8. Much of what Polo wrote was not believed by thirteenth-century European society, and he was nicknamed “Il Milione,” for his “million lies” (Impey, *Chinoiserie*, 25). His father, Nicolò, and uncle, Maffeo, left the Crimea around 1260 and traveled the trade routes to the Mongol capital of Khanbalikh, arriving there in late 1265 or early 1266. The khan was most curious about Europe and sent the brothers back to Europe with the request to send additional educated Europeans to the Mongol court. They set out again in 1271 with young Marco and two Dominican friars, who turned back. In 1275, they reached Kublai Khan (Lach, *Asia*, vol. 1, bk. 1, pp. 34–35).

9. Polo, *The Travels*, 238.

10. Daisy Lion-Goldschmidt, “Les Porcelaines Chinoises du Palais de Santos,” *Arts Asiatiques* 24 (1984): 2–72. This magnificent ceiling is illustrated in Jessica Rawson, ed., *The British Museum Book of Chinese Art* (New York: Thames and Hudson, 1993), fig. 207.

11. These were warehouses and offices, not places where goods were manufactured. The British were the first to built there, followed by the Dutch, French, Danish, and Swedish East India companies. The Americans entered the trade much later.

12. These blue-and-white wares, which were made in China in vast quantities almost exclusively for the export market, were known as Kraak wares, a Dutch corruption of the name for the Portuguese ships that carried this porcelain. Maura Rinaldi, *Kraak Porcelain: A Moment in the History of Trade* (London: Bamboo, 1989).

13. For example, Queen Hedvig Eleonora of Sweden (1636–1715) had a passion for Chinese porcelain. The Dutch sent large quantities of these goods to her, as recorded in the account books of Dutch merchants in the years 1695, 1698, and 1699. Åke Setterwall, Stig Fogelmarck, and Bo Gyllensvärd, *The Chinese Pavilion at Drottningholm* (Malmö: Allhems, 1974), 127.

14. Craig Clunas, ed., *Chinese Export Art and Design* (London: Victoria and Albert Museum, 1987), 16.

15. All Europe was eager to imitate the hard, thin, and finely textured body of Chinese porcelain, which contrasted with the thicker, gray bodied soft-paste porcelain of Europe. While in the employ of Augustus the Strong, elector of Saxony (1670–1733), himself an avid collector of Chinese and Japanese ceramics, Johann Friedrich Böttger (1682–1719) made the discovery of hard-paste porcelain in 1708. This led to the establishment in 1710 of the Royal Saxon Porcelain Manufactory at Meissen, just outside Dresden (Honour, *Chinoiserie*, 104).

The Imari porcelain manufactured in seventeenth-century Japan was much admired by Augustus the Strong. Imari was the port from which the porcelain was shipped to Europe, and the word came to be applied in Europe to a particular style of porcelain decoration. The porcelain itself was manufactured inland at Arita and other nearby sites. Recently, an eleven-hectare theme park opened in honor of this famous

ware in Sasebo, Japan. Sasebo is located on the other side of the peninsula from Imari. The collection of Imari porcelain is housed in a replica of Augustus's Zwinger Palace at Dresden (*Time*, May 10, 1993, 2).

16. George Parker, *A Treatise of Japaning and Varnishing: Being a Compleat Discovery of Those Arts; With the Best Way of Making All Sorts of Varnish for Japan, Wood, Prints, or Pictures. The Method of Guilding, Burnishing, and Lackering . . . Together with the Above an Hundred Distinct Patterns for Japan-work . . . Curiously Engraven on 24 Large Copper-plates* (Oxford: Printed for, and sold by the author, 1688).

17. "Japanning," which had gone out of fashion in the 1730s, came back just prior to the 1750s, a time that saw the publication of such works as *The Ladies Amusement or Whole Art of Japanning Made Easy*, 2d ed. (London: Printed for R. Sayer, 1762).

18. Honour, *Chinoiserie*, 104. Budai may have been a historical figure who died ca. 916. This Chan eccentric is a frequent subject of Chan Buddhist art, depicted as unkempt and potbellied, wandering about with his possessions bundled in a large cloth bag that he carries over his shoulder on a stick. His name is a pun, for it can mean "cloth bag" or "glutton," a reference to his begging for food. Budai is thought to be a transformation of Maitreya and has become a popular figure in Chinese folk religion. Jan Fontein and Money L. Hickman, *Zen Painting and Calligraphy* (Boston: Museum of Fine Arts, Boston, 1970), xxx, 24.

19. One of the scenes in the early-eighteenth-century tapestries entitled *tentures chinoises* was "picking pineapples," which showed one of the supposed recreations in the life of the Chinese emperor and empress. This idea probably came from the writings of Nieuhof and Kircher. Nieuhof wrote that the Chinese palace contained "many amusing things, no doubt even pineapples as at the French court" (cited in Jarry, *Chinoiserie*, 21). Kircher had written of the fruit that it had "so pleasant and exquisite a taste, that it may easily obtain the preeminence among the most noble Fruits of India and China." From Kircher's *Description of China*, included in Jan Nieuhof, *An Exact Relation of the Embassy Sent by the East-India Company of the United Provinces to the Grand Tartar of Cham, or Emperor of China* (printed by the author, 1673), 411. Kircher includes in his work an illustration showing a monkey squatting next to a pineapple plant and eating a fruit.

20. Edmond de Goncourt and Jules de Goncourt, *French XVIII Century Painters: Watteau, Boucher, Chardin, La Tour, Greuze [and] Fragonard*, trans. R. Ironside (London: Phaidon Press, 1948), 55.

21. Honour, *Chinoiserie*, 90.

22. Honour, *Chinoiserie*, 90–91. Monkeys also figured prominently in Kircher's influential *China Monumentis*. In his illustration entitled "Modus Scribendi," a monkey is shown squatting on the floor echoing the body position of a Chinese man standing at a table and writing with a brush pen (233).

23. Schafer suggests that the form of the Chinese "phoenix" originates with an Indochinese pheasant. Edward H. Schafer, *The Vermilion Bird: T'ang Images of the South* (Berkeley and Los Angeles: University of California Press, 1967), 243. See also the illustration and description in the Ming-dynasty encyclopedia *Sancai tuhui* (Tripartite picture arrangement), compiled by Wang Qi, 1607 (rpt. Taipei: Chengwen, 1970), section on birds and beasts, *juan* 1, 1a–b.

24. Impey, *Chinoiserie*, 12 and fig. 8.

25. Dawn Jacobson, *Chinoiserie* (London: Phaidon, 1993), 171.

26. Honour, *Chinoiserie*, 93. The first set of *tentures chinoises* was very different from the "gay and voluptuous" chinoiserie tapestries by Boucher. These ten tapestries,

also woven at Beauvais, date from the early eighteenth century and were based largely from illustrations in Nieuhof's *L'ambassade* of 1665. Interestingly, one panel, entitled "The Astronomers," shows Adam Schall von Bell in mandarin robes holding a compass to a sphere while several Chinese look on. This is illustrated in color in Jarry, *Chinoiserie*, pl. 2, and is discussed 15–26. His pose is similar to an engraving of Schall found in Kircher, *China Monumentis*, between pages 112 and 113.

27. Honour, *Chinoiserie*, 92–93.

28. Eleanor Von Erdberg, *Chinese Influence on European Garden Structures* (Cambridge, 1936; rpt. New York: Hacker Art Books, 1985).

29. Von Erdberg, *Chinese Influence*, 59–61; and Impey, *Chinoiserie*, 146.

30. Jarry, *Chinoiserie*, 64. The building proved too delicate and was torn down in 1687. A new Trianon was built in 1688 that was not Chinese in its design (Von Erdberg, *Chinese Influence*, 61).

31. Well-known extant examples of chinoiserie architecture include the Japan House in the park of Sans Souci, Potsdam, outside Berlin, built in 1754–56; the Chinese Pavilion at Pillnitz near Dresden, built in 1804; and the Chinese Pavilion at Drottningholm, Stockholm, rebuilt in 1769. A useful annotated list of chinoiserie buildings in Europe is given in Von Erdberg, *Chinese Influence*, 145–89.

32. Chambers was born in Stockholm but was raised in England. He served as supercargo for the Swedish East India Company. The famous pagoda at Kew was built in 1761–62. Von Erdberg, *Chinese Influence*, 161.

33. The best known of these are *Designs of Chinese Buildings, Furniture, Dresses, Machines and Utensiles* (1757); and *A Dissertation on Oriental Gardening* (1772), both by Sir William Chambers; W. and J. Halfpenny, *New Designs for Chinese Temples* (1752); and Paul Decker, *Chinese Architecture, Civil and Ornamental, Being a Large Collection of the Most Elegant and Useful Designs of Plans and Elevations, &c. . .* (1759).

34. Henri Cordier, *La Chine en France au XVIIIe Siècle* (Paris: Henri Lautens, 1910), 90–91. A similar piece belonged to Marie Antoinette and was set up at the Petit Trianon. It was known as the *Jeu de bague de la Reine*. A contemporary illustration may be found in Cordier, between 120 and 121.

35. Paul Johnson, *Birth of the Modern* (London: Weidenfeld and Nicolson, 1991), 152.

36. This type of theater began in Germany around 1767 and was known as *Schatenspiel* (Cordier, *La Chine en France*, 91–92). Shadow theaters are also known in Asia, including the countries of Turkey, China, and most of Southeast Asia.

37. For a study of Chinese wallpapers in Europe, see Friederike Wappenschmidt, *Chinesische Tapeten für Europa* (Berlin: Deutscher Verlag für Kunstwissenschaft, 1989).

38. Lucie Achard, *Rosalie de Constant, sa Famille et ses Amis* (Geneva, n.d.), 76, as cited in Cordier, *La Chine en France*, 50.

39. The clocks for these rooms did not always follow the chinoiserie style. For the Chinese Pavilion at Drottningholm Palace in Sweden, rebuilt in 1769, Queen Lovisa Ulrica chose for the library two French bracket clocks mounted on the backs of elephants. Although not in a Chinese style to fit the overall theme of this pleasure palace, the clocks were exotic enough to be quite unlike anything produced in Sweden, and therefore complemented the Chinese objects in the room (Setterwall, Fogelmarck, and Gyllensvärd, *Chinese Pavilion at Drottningholm*, 110).

40. Jarry, *Chinoiserie*, 201. In the mid-eighteenth century, chinoiserie andirons were set in the fireplace, echoing the style of the chinoiserie clock placed above. See

also the section on “Les belles pendules,” in Perregaux and Perrot, *Les Jaquet-Droz et Leschot*. Music was written composed for mechanical pieces: for example, Mozart’s Fantasia in F-Minor, K. 608, was written originally for a mechanical clock. See Alexander Buchner, “Mechanical Instruments,” in *The New Grove Dictionary of Music and Musicians*, ed. Stanley Sadie, 20 vols. (Washington, D.C.: Grove’s Dictionaries of Music, 1980), 12:3–9.

41. Several extant Chinese rooms include among their furnishings elaborate clocks. One particularly fine example is the chinoiserie wall clock set against a Chinese panoramic painted wallpaper, dated around 1780, at Huis Ten Bosch, a summer palace near the Hague. See Wappenschmidt, *Chinesische Tapeten für Europa*, plate 4. Other examples include rooms at Wörlitz, Anhalt-Dessau; the Schlossmuseum Riegersburg, Austria; and Pillnitz (Wappenschmidt, *Chinesische Tapeten für Europa*, figs. 34, 42, 110, and 111). A birdcage clock is found in a Chinese room at Wilhelmsthal, Calden (Wappenschmidt, *Chinesische Tapeten für Europa*, fig. 86). A similar clock with moving birds, dated to the 1780s, hangs in Rosenborg Palace, Copenhagen. Jørgen Hein, *Rosenborg Palace* (Copenhagen: Rosenborg, 1990), item 1411. A cage of this type, probably by Henri Maillardet and dated ca. 1785, made its way to China and is now in a private collection (P2, 103).

42. H-S, 17, in describing a clock by the London maker James Cox.

43. Although chinoiserie reached its zenith in the 1750s, some remnants of the style persisted until the nineteenth century, when such examples as the Royal Pavilion at Brighton (1802), a “half Chinese, half Hindu folly” (Jarry, *Chinoiserie*, 227), and the three-story pagoda fountain at Alton Towers, Shropshire (finished after 1827) were built (see Honour, *Chinoiserie*, fig. 106).

44. Cox, *Descriptive Catalogue*, July 6, 1772, 3. This section was later reprinted in Cox, *Descriptive Inventory*, 1773, 3, and in two editions of the *Descriptive Inventory* in 1773 and 1774 for the lottery held to dispose of his pieces.

45. Meyrick, *Short Account*, 6, quoting Cox.

46. Cox, *Descriptive Catalogue*, March 2, 1772, 8–9.

47. Cox, *Descriptive Inventory*, 1773, preface, iii.

48. Cox, *Descriptive Catalogue*, March 2, 1772, 1.

49. H-S, PM (Palace Museum) no. 111.

50. Nieuhof, *L’ambassade*; Kircher, *China Monumentis*. In the same year, this was also published in Latin by Johannes Janson van Waesberg of Amsterdam. The work appeared later in Dutch (1668), French (1670), English (1669), and again in Latin (1672). For complete bibliographic citations for these works, see Lust, *Western Books on China*, entries 37–39.

51. Von Erdberg, *Chinese Influence*, 161. For a contemporary description of this building, see Sir William Chambers, *Plans, Elevations, Sections, and Perspective Views of the Gardens and Bridges at Kew, Surry, the Seat of Her Royal Highness The Princess Dowager of Wales* (London: Published for the author, 1763; rpt. Farnborough, Hants.: Gregg Press, 1966).

52. Cited in Honour, *Chinoiserie*, 150.

53. Sir William Chambers, *Designs of Chinese Buildings, Furniture, Dresses, Machines, and Utensils* (London: Published for the Author, 1757; rpt. New York: B. Blom, 1968).

54. Setterwall, Fogelmarck, and Gyllensvärd, *Chinese Pavilion at Drottningholm*, 184–87, illustrated 187. A later example, which stands at 276 cm in height, made of porcelain with underglaze blue and overglaze enamels, and dating to about 1800–1815,

may be found in the Victoria and Albert Museum, London. Nick Pearce, “Ceramics Made to Special Order,” in Clunas, *Chinese Export Art*, fig. 59.

55. Another example may be found in the collection of the Royal Ontario Museum (928.29.269). Made of gilt bronze, this vase is embellished with four bats and three flower heads of carved hardstone and is likely by a Chinese maker. This shape was seen in Chinese ceramics as early as the Wanli period (1573–1620). Clocks of this shape are often called sedan chair clocks, probably because similar ceramic pieces were referred to as sedan chair vases. An example of the ceramic shape is illustrated in Cécile Beurdeley and Michel Beurdeley, *A Connoisseur's Guide to Chinese Ceramics*, trans. Katherine Watson (New York: Leon Amiel, 1974), 255, fig. 134.

56. For descriptions of all three clocks, and an illustration of the piece by G. Duck, see H-S, 18, 20, 25, and pl. 22.

57. Cited in Honour, *Chinoiserie*, 130.

58. Cox, *Descriptive Catalogue*, July 6, 1772, 3.

59. H-S, 23. Harcourt-Smith identifies the maker of the movement as Marriott of London; the base is signed “Lewis Pantin Fec. London” (H-S, 23). Lu Yanzhen gives the maker as “John Houes Pinx” (LY, 124).

60. Planchon, *L'Horloge*, 262.

61. These missionary artists at court included Lodovico Buglio (1606–82), John Grueber (1623–80), Joachim Bouvet (1656–1730), Jean de Fontaney (1643–1710), Christopher Fiori (d. 1706?), Charles de Belleville (1656–after 1700), Giovanni Gherardini (1659–?), Matteo Ripa (1682–1745), Giuseppe Castiglione (1688–1766), Ignatius Kögler (1680–1746), Jean-Denis Attiret (1702–68), Michel Benoît (1715–74), Ignatius Sichelbart (1708–80), Louis de Poirot (1735–1814), Giuseppe Panzi (ca. 1733–1811), Ferdinand-Bonaventure Moggi (1684–1761), Paul-Auguste Amoretti (1740–83).

62. Chinnery was born in London and studied under Sir Joshua Reynolds. He fled to India to escape an unhappy marriage and in 1825 arrived in China, where he enjoyed a reputation as a portrait and landscape painter of some skill. For more information on Chinnery and his art, see Henry Berry-Hill and Sidney Berry-Hill, *Chinnery and China Coast Paintings* (Leigh-on-Sea: F. Lewis, 1970); and Robin Hutcheon, *Chinnery: The Man and the Legend* (Hong Kong: South China Morning Post, 1975). On Chinnery's followers, see Carl L. Crossman, *The Decorative Arts of the China Trade: Paintings, Furnishings, and Exotic Curiosities* (Woodbridge, Suffolk: Antique Collectors' Club, 1991). Prior to Chinnery's arrival on the South China coast, there was an earlier Jesuit college in Macao, whose pupils, some of whom were Japanese Christian refugees, learned to paint in oils.

63. *Lettres Edifiantes et Curieuses*, new ed., 22:493–95.

64. This anonymous portrait of Xiangfei dressed as a French peasant girl is now housed in the Palace Museum, Beijing (Sullivan, *Meeting*, 72, and fig. 42). The story of Xiangfei is a myth. The childless concubine Rongfei was the real person transformed into this legend. See James A. Millward, “A Uyghur Muslim in Qianlong's Court,” *Journal of Asian Studies* 53, no. 2 (1994): 427–58.

65. This is illustrated in Honour, *Chinoiserie*, fig. 36.

66. This portrait by Giuseppe Castiglione is in the collection of the Palace Museum, Beijing (Hedin, *Jehol*, pl. 46 and p. 222).

67. A comprehensive list of the full collection of the Palace Museum, Beijing, does not exist, and therefore these assumptions are based on the pieces published in LY, the most comprehensive publication of the collection to date.

68. This is described in Shang Zhinan, “Qingdai gongzhong de Guangdong

zhongbiao” (Cantonese clocks of the Qing dynasty in the palace), *Gugong bowuyuan yuankan* 1986, no. 3: 11.

69. The *qilin* is an auspicious animal, symbolic of longevity, and believed to give sons who will become officials to childless families. It is said to appear only during the reigns of virtuous emperors and last made an appearance during Confucius’s time. Belief in the *qilin* goes back to at least the Zhou period (ca. 1050–475 B.C.), and it is mentioned in the *Liji* (Book of rites). Because the *qilin* is a legendary beast, its form has not been established, although it is said to have the body of a roe deer, the tail of an ox, the hooves of a horse, and a voice like bells. It is one of the four mythical animals of China, the others being the dragon, the phoenix, and the tortoise. Wang Qi, *Sancai tuhui*, section on birds and beasts, *juan* 3, 2a–b; and Nancy Zeng Berliner, *Chinese Folk Art: The Small Skills of Carving Insects* (Boston: Little, Brown, 1986), 56.

70. The novel is attributed to Wu Cheng’en (ca. 1500–1582) and is in part based on the adventures of the Buddhist monk Xuanzang (596–664), who traveled to India in search of Buddhist writings (Nienhauser, *Indiana Companion*, 413–14). Traditionally, the peach has been symbolic of longevity. In her garden, the Queen Mother of the West, Xiwang mu, had a peach tree that blossomed once each three thousand years and produced fruit after an additional three thousand years. When consumed, these peaches conferred immortality. C. A. S. Williams, *Outlines of Chinese Symbolism and Art Motives*, 3d ed. (Shanghai: Kelly and Walsh, 1941; rpt. New York: Dover, 1976), 315–17.

71. Stephen Little, *Realm of the Immortals: Daoism in the Arts of China* (Cleveland: Cleveland Museum of Art, 1988), 11, 42; and Williams, *Outlines of Chinese Symbolism*, 271. For a Ming-dynasty illustration of Li Tieguai with his gourd and iron crutch, see Wang Qi, *Sancai tuhui*, renwu section, *juan* 1, 24a.

72. Justus Doolittle, *Social Life of the Chinese. A Daguerreotype of Daily Life in China* (London: S. Low and Son, and Marston, 1868), cited in Williams, *Outlines of Chinese Symbolism*, 217.

73. The *lingzhi*, *Polyporus lucidus*, has been symbolic of long life since the Ming dynasty: cf. Margaret Medley, *A Handbook of Chinese Art* (New York: Harper and Row, Icon Editions, 1964), 74–76; and Williams, *Outlines of Chinese Symbolism*, 328–30. The deer is believed by the Chinese to live a long time and is also able to find the *lingzhi*. The horn of the deer is still regarded as being able to prolong life when eaten (Williams, *Outlines of Chinese Symbolism*, 115–16).

74. Yang Boda, *Qingdai Guangdong gongpin*, fig. 43.

75. This is suggested by Soulié de Morant in *Histoire de l’Art Chinois*, 23, cited in Jenyns, “Painted (Canton) Enamels,” 143.

76. From the manuscript diary of Matteo Ripa, as cited in Loehr, “Missionary Artists at the Manchu Court,” 55.

77. Overglaze enameled porcelains that use this color are known as *famille rose*.

78. This is discussed at length in Jenyns, “Painted (Canton) Enamels,” 144–45.

79. Honour, *Chinoiserie*, 93.

80. In his discussion of Chinese export art, Clunas has said that this predominance of Western motifs represents “in the design sphere China’s increasing political and economic subordination to the West” (*Chinese Export Art*, 20).

81. Cox, *Descriptive Catalogue*, July 6, 1772, 2.

82. Cox, *Descriptive Catalogue*, July 6, 1772, 2.

83. Only in the mid-nineteenth century were specific modifications made to the watches for the Chinese market, such as a stop-seconds hand. Supplying watches in

pairs, a suggestion made by European merchants in China, was not much of a change for the makers who were already producing paired watches for their European clientele. Refer to the record books of Geneva clock- and watchmakers Jaquet-Droz et Leschot as reproduced in Chapuis and Droz, *Automata*, 198–99.

84. *St. James's Chronicle*, August 27–29, 1772.

85. In the later part of the eighteenth century, artists such as William and Thomas Daniell, who traveled to China in 1784, and William Alexander (1767–1816), who was in the service of the Macartney embassy of 1793, returned to England with watercolor sketches depicting China more realistically. However, their works, which were widely disseminated in tinted etchings, still showed China from a European point of view. These works displayed a somewhat romanticized and “picturesque” land different from the China of Pillement and Boucher. William and Thomas Daniell, *Picturesque Voyage to India by Way of China*; and William Alexander, *Picturesque Representations of the Dress and Manners of the Chinese* (London: Printed for Thomas M'Lean by Howlett and Brimmer, early nineteenth century). Here I must disagree with Hugh Honour, who writes that these “lightly and “delicately drawn” works show no sentimentality in their depictions of the Chinese and the Chinese landscape (*Chinoiserie*, 177). Although much more accurate than previous European representations, these still showed a certain romantic flavor.

86. Clunas, *Chinese Export Art*, 20.

87. Leslie Thomas, *The Story on the Willow Plate* (New York: William Morrow, 1940); Honour, *Chinoiserie*, 195.

88. Rose Kerr, “Ceramics Exported in Bulk,” in Clunas, *Chinese Export Art*, 44.

89. Cawthorne, “*Of Taste*” in *Poems*, 115.

Conclusion

1. MR, 179–80.

2. Ricci's actual successor was Adam Schall von Bell (1591–1666), who arrived in Beijing in 1622. Longobardi, with Jesuit Manuel Diaz, constructed the first Western terrestrial globe in China in 1623. This globe is in the collection of the British Museum. Nigel Cameron, *Barbarians and Mandarins: Thirteen Centuries of Western Travellers in China* (New York: John Weatherhill, 1970), 197, 204, 205.

3. This statement was made in connection with Nicolas Trigault's voyage from China to Europe to procure books and other items of interest to the Chinese in 1613. It is cited in Chapuis and Droz, *Automata*, 79.

4. GM, 340.

5. Naquin and Rawski, *Chinese Society*, 76–77.

6. Sullivan, *Meeting*, 85.

7. Sullivan, *Meeting*, 79.

8. Loehr, “Missionary Artists at the Manchu Court,” 66.

Appendix A

1. S. W. Bushell, *Chinese Art*, 2d ed. (London: H. M. Stationery Office, 1909), 1:120.

2. These twenty-seven factories, according to Bushell, were as follows: metal

foundries; fabrication of *ruyi* scepters; glass works; clock and watch manufactory; preparation of maps and plans; fabrication of cloisonné enamels; fabrication of helmets; work in jade, gold, and filigree; gilding; ornamental chiseling of reliefs; manufacture of inkstones; incrusting work; works in tin and tinplating; ivory carving; wood engraving and sculpturing; fabrication of lacquer; chiseling of movable type; fabrication of incense burning sets; manufacture of painted boxes; joiners and carpenters; lantern manufactory; artificial flowers; works in leather; mounting pearls and jewels; chiseling metals; armorers; and manufacture of optical instruments (*Chinese Art*, 1:120). Bushell was not the first Western writer to put the date of the establishment of the imperial workshops at 1680, as Maurice Paléologue gave this same date in his *L'Art Chinois* (Paris: Maisson Quantin, 1887), cited in Planchon, *L'Horloge*, 261.

3. Dan Shiyuan, *Gugong shihua* (History of the imperial palace) (Beijing: Zhonghua shudian, 1964), 32.

4. Dan Shiyuan, *Gugong shihua*, 31, states that the Imperial Household Department was termed the *neifu* in the Ming dynasty and the *Neiwufu* in the Qing. Although the official Qing documents state vaguely that “it was begun in the early days of the dynasty,” Chang Te-ch’ang traces the earliest mention of this organization to 1628 (“Economic Role,” 244 n. 5). Bushell connected the workshops with the Board of Works (*gongbu*). The *Neiwufu* was not part of this administrative unit (Chang, 270). For a history of the *Neiwufu*, see Chang Te-ch’ang and Preston M. Torbert, *The Ch’ing Imperial Household Department: A Study of Its Organization and Principal Functions, 1662–1796* (Cambridge: Harvard University Press, Council on East Asian Studies, 1977).

5. Paraphrased from Chang Te-ch’ang, “Economic Role,” 245–46. Chang quotes from the *Da Qing hui dian* of the Jiaqing period, 724:1–2.

6. Chang Te-ch’ang, “Economic Role,” 249, 250 n. 32.

7. *Da Qing huidian shili* (Collected statutes of the Great Qing), cited in Zhang Linsheng (Chang Lin-sheng), “Qing Gong biyanhu zhiqi kao” (An examination of the manufacture of snuff bottles in the Qing palace), *Gugong xueshu jikan* 8, no. 2 (1990):

8. Craig Clunas also cites this passage, from the Guangxu edition, *juan* 1273, 4b, in “Ming and Qing Ivories,” 123.

8. Mungello, *Curious Land*, 329–30.

9. Dan Shiyuan, *Gugong shihua*, 33; and Bushell, *Chinese Art*, 1:120.

10. Dorn, *The Forbidden City*, 235.

11. *Da Qing huidian shili*, *juan* 917, 14b, cited in Clunas, “Ming and Qing Ivories,”

122. Clunas does not list these workshops.

12. Dan Shiyuan, *Gugong shihua*, 32.

13. From an essay by Chong Zhang on the workshops and craftsmen of the *Zaobanchu*, cited by Clunas, “Ming and Qing Ivories,” 123.

14. Liu Liangyu, “Chinese Painted and Cloisonné Enamel: Introduction,” *Arts of Asia* 8, no. 6 (1978): 84. There is a slight discrepancy between the numbers of workshops reported by Chong (forty-two to thirteen), and those given by Liu (thirty-eight to fourteen), which likely reflects different interpretations of the texts.

15. Sixty-one different crafts were practiced, some grouped together under one name, such as *Ruyiguan* (Clunas, “Ming and Qing Ivories,” 123).

16. Chang Te-ch’ang, “Economic Role,” 250.

17. Yang Boda, “Qingdai gongting yuqi” (Imperial jades of the Qing dynasty), *Gugong bowuyuan yuankan* 1982, no. 2: 50, although this date could be as late as the nineteenth year of Kangxi (1680), as suggested in Dan Shiyuan, *Gugong shihua*, 32.

18. Wu Changyuan, *Chenyuan shilue* (Summary of knowledge of the Imperial City) (1788; Beijing: Guji chubanshe, 1981), map, 84. The locations of the Zaobanchu and Nei wufu are similar in a Qing-dynasty map illustrated in Zhu Xie, *Ming Qing liangdai gongyuan jianzhi yan'ge tukao* (Study with maps of the changes in the buildings in the imperial palace of the Ming and Qing dynasties) (Shanghai: Shanwu yinshuguan, 1947).

19. Nei wufu zaobanchu (Office of Manufacture of the Imperial Household Department), archival documents nos. 1871–1912, Number One Historical Archives, Beijing.

20. Liu Liangyu, “Painted and Cloisonné Enamel,” 84.

21. Jenyns, “Painted (Canton) Enamels,” 144.

22. Nei wufu zaobanchu, archival documents nos. 1871–1912, Number One Historical Archives, Beijing. By the nineteenth century, the centers of clock manufacture were referred to simply as “within the palace” (*chengnei*) and at the Yuanmingyuan.

23. Liu Liangyu, “Painted and Cloisonné Enamel,” 84.

24. For the “whispered gossip” of events that took place in this palace in the late nineteenth century, see L. C. Carlington and William Lewisohn, *In Search of Old Peking* (Beijing: Henri Vetch, 1935; rpt. Hong Kong: Oxford University Press, 1987), 59–60.

25. Bushell mistakenly translated *Ruyiguan* as the workshop where *ruyi* scepters were made. The Ruyiguan was a workshop for a number of different crafts, including ivory carving, jade carving, rubbings, and mounting of paintings (Clunas, “Ming and Qing Ivories,” quoting from Chong Zhang, 123; see also Wu Changyuan, *Chenyuan shilue*, 935).

26. A more recent map of the Forbidden City shows the location of the Ruyiguan to be just north of the Six East Palaces (Gugong bowuyuan gujian guanlibu, *Cijincheng gongdianjian zhuzhuangshi*, 10).

27. See Yang Boda, “Qing Qianlong chao huayuan yan'ge” (The evolution of the art academy in the Qianlong period of the Qing dynasty), *Gugong bowuyuan yuankan* 1992, no. 1: 3–11, 89; and Liu Fenghan, *Yuanmingyuan xingwangshi* (History of the Yuanmingyuan) (Taipei: Wenxing shudian, 1963), 47. The painting workshop was established at the Ruyiguan in 1736.

Appendix C

1. This may be D. F. Aubert of Geneva, who was active in the early nineteenth century (GB, 10).

2. Dennis, “Some Jeweled Toys,” 164.

3. “PM” was used by Harcourt-Smith to identify clocks in the Palace Museum.

4. H. Alan Lloyd, “English Clocks for the Chinese Market.” *Antique Collector* 22, no. 1 (January–February 1951), fig. 1.

5. Mentioned in P1, 66. Baillie lists an early watchmaker and one of the first enamel painters, Christophe Morlière of Blois (1604–43).

6. Nezu bijutsukan, *Shinchō tokei* (Qing-dynasty timepieces) (Tokyo: Nezu bijutsukan zōhin shiriizu 3, 1962), n.p.

7. “WYT” was used by Harcourt-Smith to identify items in the Wuyingdian.

8. Staunton, *Historical Account*, 304. This was also noted by Macartney in his journal (GM, 95).

9. Lloyd, "English Clocks," fig 2.
10. Jürgen Abeler, *Das Wuppertaler Uhrenmuseum* (Berlin: Walter de Gruyter, 1971), 25.
11. François Jequier, *Une Entreprise Horlogère du Val-de-Travers: Fleurier Watch Co SA*. (Neuchâtel: Éditions de la Baconnière, 1972), 40.
12. BL, 83. This information supersedes that of Baillie, who listed the company as working out of London.
13. This date is too late for the company of Fromantel and Clarke, which was active ca. 1700.
14. Regarding "Blois and Morlier," see note 4 above.
15. GB, 162. Alfred Chapuis mentions a "Hughes William" who worked in London in the late eighteenth century, whom I suspect is the same fellow (*Rérelations de l'Horlogerie Suisse*, 60).
16. Bruton, *Clocks and Watches*, 98; and GB, 195.
17. GB, 211. Loomes mentions a Thomas Martin who made clocks and watches between 1780 and 1823 (BL, 155).
18. Nezu bijutsukan, *Shinchō tokei*, 2.
19. Nezu bijutsukan, *Shinchō tokei*, n.p.
20. This same clock is illustrated in Silvio A. Bedini, "Oriental Concepts of the Measure of Time," in *The Study of Time II*, ed. J. T. Fraser and N. Lawrence (New York: Springer-Verlag, 1975), fig. 6, now in the collection of Mr. Bedini.
21. Both Baillie and Loomes (BL, 194) list a second Thomas Rayment (d. ca. 1791), of Stamford, who made clocks and watches.
22. Chapuis, *Rérelations de l'Horlogerie Suisse*, 60.
23. S. E. Bedini, "Oriental Concepts of the Measure of Time," in *The Study of Time II* ed. J. T. Fraser and N. Lawrence (New York: Springer-Verlag, 1975).
24. Lloyd, "English Clocks," fig. 3.
25. Nezu bijutsukan, *Shinchō tokei*, cover.
26. Nezu bijutsukan, *Shinchō tokei*, n.p.

Transliterations

a ge 阿哥
An Wensi 安文思
Ba fang xiang hua, jiu tu lai wang
八方向化九土來王
Ba Maozheng 巴茂正
Baohedian 保和殿
baoshan lou 寶山漏
Beitang 北堂
Bilinguan 碧琳館
Bishushanzhuang 避暑山庄
Bowei 播威
Cao Xueqin 曹雪芹
Changchunyuán 長春園
Chaoye qianzai 朝野僉載
Chen Rui 陳瑞
Chongqing 崇慶
Cininggong 慈寧宮
Cixi 慈禧
daji 大吉
Damingdian denglou 大明殿燈漏
Daoxuan 道宣
Daqin 大秦
dayi 大儀
De Tiansi 德天賜
Dongtang 東堂
Duanningdian 端凝殿
Du Demei 杜得美
fanglang wucai 法瑯五彩
Feng Shike 馮時可
Fuheng 傅恆
Fulin 拂林
Gao Shiqi 高士奇
geng 更
gongdan 貢單

gongyong 共用
Guangchusi 廣出司
Guo Shoujing 郭守敬
Guo Yingping 郭應聘
Haidian 海淀
Han Guoying 韓國英
He guiren 和貴人叉
Heshen 和坤
hō-ō 鳳凰
Hongdedian 弘德殿
Honglou meng 紅樓夢
huaping 花瓶
hubu 戶部
hulu 葫蘆
Huangchao liqi tu shi 皇朝禮器圖式
Jia 賈
Jiaqing period 嘉慶
Ji Li'an 紀理安
jindan 進單
Jingrengong 景仁宮
Jingshan ren 景山人
Jingyixuan 靜怡軒
Jin Nige 金尼各
Jinshu 晉書
Jiu Tangshu 舊唐書
Kaifeng 開封
Kangxi 康熙
ke 刻
Liang Lingzan 梁令瓚
Liang Zhangju 梁章鉅,
Li He 李賀
Li Junxian 李俊賢
Li Madou 利瑪竇
Li Madou pusa 利瑪竇菩薩

- lingzhi* 靈芝
 Lin Jige 林濟各
 Li Tieguai 李鐵拐
 Liu Cangzhou 劉滄 (or 倉) 州
 Liu Yu 劉玉
 Li Yutong 李裕同
 Lu Baijia 陸佰嘉
 Lumuwucun 陸墓五村
mingtang 明堂
 Nantang 南堂
 Nei wufu 內務府
 Nei wufu zaobanchu 內務府造辦處
 Ningshougong 寧壽宮
 Pan Feng 潘鳳
Pengchuang xulu 蓬窗續錄
 Qianlong 乾隆
Qianlong nianzhi 乾隆年製
Qianlong yuzhi 乾隆御制
 Qianqinggong 乾清宮
qilin 麒麟
Qinding da Qing huidian shili
 欽定大清會典事例
Qingbai leichao 清稗類
 Qixianggong 啟祥宮
 Rehe 熱河
 Ronglu 榮祿
 Ruyiguan 如意館
 Sanxitang 三希堂
 Shangchuan 上川
shangyong 賞用
 Sha Ruyu 沙如玉
 shi 時
shi'er chenche 十二辰車
Shitou ji 石頭記
 Shi Yuanzhi 施元之
 Shouangong 壽安宮
 Shoukanggong 壽康宮
 Shunzhi 順治
 Sima Guang 司馬光
 Songshi 宋史
songzhong 送鐘
songzhong 送終
 Sun Wukong 孫悟空
 Su Song 蘇頌
Taixi shuifa 泰西水法
 Tang Ruowang 湯若望
tianheng 天衡
tiantang 天堂
tianxia taiping 天下太平
toudeng 頭等
 Wang Dahong 汪達洪 ; Matou 瑪頭
 Wang Pan 王泮
 Wang Zheng 王徵
 Wanli emperor 萬曆
Wan nian ? 萬年 ?
 Wu Cheng'en 吳承恩
 Wuyingdian 武英殿
 Wu Zhao 武照
 Xiangfei 香妃
Xiaoting xulu 曉停續錄
 Xihuangsi 西黃寺
Xin Tangshu 新唐書
Xinyixiang fayao 新儀象法要
 Xiong Sanba 熊三拔
 Xitang 西堂
 Xiwang mu 西王母
Xixue fan 西學凡
xiyang 西洋
xiyanglou 西洋樓
Xiyou ji 西遊記
 Xuanzang 玄奘
 Xu Chaojun 徐朝俊
 Xu Guangqi 徐光啟
 Xu Risheng 徐日昇
Xu wenxian tongkao 續文獻通考
 Yan Jiale 嚴 (顏) 嘉樂
 Yehe Nala 葉赫那拉
 Yi guiren 伊貴人
 Yixing 一行
 Yonghegong 雍和宮
 Yuanhe 圓盒
Yuanjian leihan 淵鑑類函
 Yuanmingyuan 圓明園
Yuanmingyuan chengnei zuozhongchu
zhongbiaodeng xiang qingce
 圓明園城內做鐘處鐘表等項清冊
Yuanxi qiqi tushuo luzui
 遠西奇器圖說錄最
 Yuanyingguan 遠瀛觀
 Yusogong 毓慶宮

Yuyongjian 御用監
Zaobanchu 造辦處
Zha De 查得
Zhaigong 齋宮
Zhang Rong 張榮記
Zhang Sixun 張思訓
Zhao Lian 昭樾
Zhaoqing 肇慶
Zhao Yi 趙翼
Zhenzhailou 真齋樓

Zhongbiao hangshang hui 鐘表行商會
Zhuqi tushuo 諸器圖說
Zimingzhongbiao tufa 自鳴鐘表圖法
Zimingzhongchu 自鳴鐘處
zitan 紫檀
Zizhi tongjian 資治通鑑
zuofang 作坊
zuozhongchu 做鐘處
Zuo zhuan 左傳

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